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**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

**Assessing Options for Contingent Contracting of Merchant Ships for
Naval and Expeditionary Operations**

**By: Athanasios Dimitriou
December 2008**

**Advisors: R. Frank, PhD
R. Looney, PhD**

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**ASSESSING OPTIONS FOR CONTINGENT CONTRACTING OF MERCHANT
SHIPS FOR NAVAL AND EXPEDITIONARY OPERATIONS**

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ABSTRACT

Strategic sealift is a perpetual concern for every naval officer planning naval operations. Historical experience (such as WW II, Korean War, Vietnam War, Operation Corporate, Operations Desert Shield/Desert Storm, the 2006 Lebanon evacuation of foreign nationals) help us understand the great importance of merchant shipping in naval operations.

The types of merchant ships most useful for military operations, as well as the sealift organization and capabilities of Greece, the U.S.A., NATO, the European Union and the Athens Multinational Sealift Coordination Center (AMSCC) are reviewed in this thesis.

It also analyzes the shipping industry, which is highly specialized. Accordingly, naval officers and government executives need to thoroughly understand its peculiarities, as well as its capabilities and limitations in military operations. This thesis discusses the structure of shipping markets, and analyzes the methods available for contingency contracting of merchant vessels (spot market, lease, options, and requisition) for naval and expeditionary warfare, particularly leasing and options. The advantages and disadvantages of the various methods of acquiring merchant shipping are presented in detail.

Finally, we reach a number of conclusions and recommendations about merchant shipping in naval operations that are useful for all naval officers, especially those planning sealift support for naval operations.

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I. INTRODUCTION

A. THESIS OBJECTIVES

This thesis will describe and analyze the different available methods of contingency contracting merchant vessels (Pay the spot market price, Lease, Purchase the option of future transportation capacity, Requisition) focusing on the options purchase as well as the leasing of merchant vessels.

Historical data will be presented, including the use of merchant shipping in military operations (WW II, Falklands Expedition, First and Second Gulf Wars and the 2006 Lebanon evacuation of foreign nationals due to Israel's invasion). Historical experience will help illuminate the great importance of merchant shipping in naval operations. What we today call a *strategic sealift* has always been a concern for every naval officer who was planning naval operations.

The shipping industry and the shipping market also need to be understood. They are specialized economic activities, and it is necessary for the naval officers to understand their capabilities to support military operations, as well as their limitations. In addition, this thesis will review the types of merchant ships that are mostly useful for military operations.

Finally, we will examine how NATO is organized to facilitate military cooperation with merchant shipping. Included will be an analysis of the initiative of the Hellenic Defense General Staff (HDGS) to establish the Athens Multinational Sealift Coordination Center (AMSCC) in order to enhance cooperation of state and military authorities with the shipping industry.

B. BACKGROUND

Merchant ships and men-of-war have operated together throughout naval history - their roles sometimes being interchangeable. Even though the specialization of modern

warfare has divided the roles of seamen in all big modern wars¹, including WWII, Hellenic merchant navy officers and sailors created a pool of experienced personnel that manned Hellenic Navy warships. Greek shipowners and seamen volunteered for service and manned HN warships². In all modern wars, the merchant navy has operated with the naval forces, and has suffered heavy losses because opponents understood the importance of strategic sealift for military operations³.

For the purpose of this thesis, we need to define “strategic sealift” in two different categories: surge and sustainment. Surge sealift assets transport combat and combat support equipment from ports of origin to the area of operations. After the initial delivery, sealift assets focus on sustaining operations by delivering food, ammunition, petroleum, and other critical support items.

Sealift operations can be carried out by merchant ships that must be chartered by military or state owned vessels that are a part of a navy’s auxiliary fleet. In the past, the most common method of contracting when merchant ships were needed had been through requisition. Each maritime state had, and in many cases still has, sufficient legal authority to requisition merchant shipping in time of war or emergency. Requisitions of services or materiel substantially predate the total war concepts of the twentieth century. In WWI and WWII, states forced shipping companies to make their ships available for wartime requisition by their respective war navies.

¹ In my thesis I will consider the modern era to start after Hellenic Independence from the Ottoman Empire (1830). This is because, as a Greek, my past is composed of the ancient years, the medieval years and the modern years.

² Typical of many such cases is that of Fotis Lykiardopoulos, of the well known shipping family, born, raised and living in London, who joined the HN in 1943 in England as a volunteer, attended the British Cadet School and participated in the Normandy Naval Landings in June 1944 on board the British Frigate HMS CHELMER. Stavros Niarchos at the age of 35 and Nicolas Michalos served on the Corvette RHS KRIEZIS, under Commander D. Kiosses RHN, together with about 100 other HMM men. Michael Maris served on the Corvette RHS TOMBAZIS, under Commander G. Panagiotopoulos RHN. Stavros Niarchos was later transferred and served on the Destroyer RHS SALAMIS. Together with two HN Corvettes, RHS KRIEZIS and RHS TOMBAZIS, the following four GMM cargo ships participated in the allied Normandy operations: 2 C/S "AGIOS SPYRIDON," captained by George Samothrakis, C/S "GEORGIOS P.," captained by Dimitrios Parisis, C/S "AMERIKI," captained by Spyridon Theofilatos and C/S "HELLAS," captained by George Trilivas.

³ Throughout WW II, the HMM lost over 2.000 seamen and more than 60% of its ocean going ships, while the HN lost more than 700 men and about 32% of its fighting ships. Shipping losses did not end with WW II in 1945. They continued beyond that period, due to sea mines laid during the war.

In the late twentieth century, however, “small wars” and an international effort for improving humanitarian relief procedures have become the norm. Therefore requisition has been replaced by leasing and conventional chartering of merchant ships, which have become an important and integral part of the logistics chain of such operations.

Nowadays, military personnel must have adequate knowledge and, if possible, experience to arrange contracts with the shipping industry — which operates in a very competitive world. Therefore, adequate knowledge is needed and research has to be made in order to inform officers that perform this task.

C. RESEARCH QUESTIONS

1. Primary Question

Which is the most cost-effective method for a government to contingently contract merchant ships (Pay the on-spot market price, Lease, Purchase the option of future transportation capacity, Requisition)?

2. Supporting Research Questions

- What is the shipping industry and what is the economic environment in which it operates?
- Which are the economic principles of maritime shipping trade?
- What is shipping risk and who bears it?
- How are freight rates determined?
- What are the variables that affect the financial performance of a shipping company?
- How are ships and shipping companies financed?
- What types of merchant ships would be most useful in naval operations?
- What is the current NATO and EU policy considering the Naval Cooperation and Guidance for Shipping?
- How can the Athens Multinational Sealift Cooperation Center enhance cooperation between the military / state organizations and the shipping industry?

D. SCOPE, LIMITATIONS AND ASSUMPTIONS

The scope of this thesis is to give a clear and easily understood picture of the shipping industry. We will focus on the contracting / chartering business, especially on situations in which one of the parties belongs to the government or to an international organization. Research will be limited to current policies and norms of the maritime trade and shipping business. Our intent is to give a realistic view of the shipping industry in order to understand its limitations and needs - especially when we need to cooperate with it. This is because merchant ships are huge capital investments and the shipowners operate in a very volatile environment. In addition, the protection and sustainment of the maritime trade is crucial for the prosperity of nations and the further development of the international economy.

Our data has been collected from various non-confidential resources. Due to the volatile economic environment in which shipping companies must operate, they are reluctant to reveal further economical data.

Our assumptions are the following:

- That the shipping industry will continue to operate according to the current economic model.
- That no global crisis or catastrophe (nuclear war, global economic breakdown) will take place.
- That NATO will continue to exist and be focused on the missions that have been agreed by the member states.

We will conclude by summarizing the issues, drawing conclusions and making recommendations concerning the cooperation between the merchant shipping industry and the military.

E. SUMMARY

This thesis is organized into eight chapters. Chapter I serves as an introduction to the research issues.

Chapter II describes the shipping industry and its fundamental financial characteristics. It also reviews methods of contracting merchant ships.

In Chapter III, we provide a historical review of the participation of merchant ships in naval operations. We will also describe the types of merchant ships that have been of most use in naval operations.

In Chapter IV, we research in depth existing methods of contracting merchant ships and analyze the pros and cons of each method. We will identify the contracting methods that have worked best so far and we will present in depth our two preferred methods of analysis: purchase the option of future transportation capacity and leasing.

In Chapter V, we present the Agencies and services in states and international organizations that assist in chartering merchant vessels in Greece (AMSCC), USA, NATO and EU.

In Chapter VI, we analyze future transportation capacity options.

In Chapter VII, we analyze the leasing method.

Chapter VIII offers findings, recommendations and conclusions.

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II. THE SHIPPING INDUSTRY

A. INTRODUCTION

The shipping industry has always been a very volatile and risky business. However, shipping has also been a vital pillar of economic development. In Chapter 3 of *The Wealth of Nations*, Adam Smith explains how economic development has gone hand in hand with sea trade [1, p.3]:

As by means of water carriage a more extensive market is opened to every sort of industry that what land carriage alone can afford it, so it is upon the sea-coast, and along the banks of navigable rivers, that industry of every kind naturally begins to subdivide and improve itself, and it is frequently not until a long time after that those improvements extend themselves to the inland parts of the country...a broad wheeled wagon attended by two men and drawn by eight horses in about six weeks time carries and brings back between London and Edinburgh nearly 4 tons weight of goods. In about the same time a ship navigated by six or eight men, and sailing between the ports of London and Leith, frequently carries and brings back 200 ton weight of goods. Since such, therefore, are the advantages of water carriage, it is natural that the first improvements of art and industry should be made where this conveniency opens the whole world to a market for the produce of every sort of labour.

Even though the inland infrastructure of the industrialized countries has advanced since the times of Adam Smith, shipping still offers lower freight rates than all the other means of transportation (land and air). It is a business where we can observe ingenuity, professionalism, tremendous profits and some disastrous miscalculations.

B. THE SHIPPING RISK

Shipping is a service business. Competitive prices, speed, reliability and security are demanded by its customers. Risk and volatility characterize the business routines of the people involved in the industry. According to Stopford, “the risk of an investment is usually measured by the standard deviation of the year-on-year return, since this gives an

indication of the variability of the return. In these terms shipping is a high risk industry with a standard deviation of bulk shipping revenues roughly twice as high as the US stock market.”

A merchant ship is a large and expensive investment. The volume of seaborne trade is continually changing, makes the decision of when to build new ships and when to scrap old ones quite risky. This is what Stopford (38) defines as *shipping risk*. If trade is growing and there are no available merchant ships to transport goods to the markets, businesses will slow down. The few shipowners that have ships available for use, they will auction their services to the highest bidders and they will make fortunes. On the other hand, if trade slows and many ships are available for charter, a lot of expensive investments will sit idle, and the unhappy owners will watch them rust away.

In addition to *shipping risk* there is *economic risk*-- which is the risk that shipowners face because the shipping business is connected with the international economy. In recessions, freight rates decline and there is not much business around. In booms, freight rates increase and the shipowners make a lot of money.

Finally the shipping companies are exposed to *operating risk*, which has to do with the risk of running the business. Ships need large amounts of unplanned maintenance, and if they are old they frequently break down. They also face the perils of the sea where a great many accidents happen.

Only a special breed of businessmen can succeed in this risky business. It is people that have the ability to manage the “shipping risk” and who can take advantage of the highs and lows of the following four markets that are included in the shipping business:

- The freight market
- The sale and purchase market
- The new building market
- The demolition market

C. THE FOUR MARKETS OF SHIPPING

Jevons, the nineteenth century economist defined a ‘market’ as follows [1, p.78]:

Originally a market was a public place in a town where provisions and other objects were exposed for sale; but the word has been generalized, so as to mean any body of persons who are in intimate business relations and carry on extensive transactions in any commodity. A great city may contain as many markets as there are important branches of trade, and these markets may or may not be localized. The central point of a market is the central exchange, mart or auction rooms where traders agree to meet and transact business...But this distinction of locality is not necessary. The traders may be spread over a whole town, or region of country and yet make a market if they are ... in close communication with each other

In shipping, the markets above trade in different commodities. The freight market trades in sea transport. The sale and purchase market trades second-hand ships. The new-building market trades new ships, and the demolition market deals in scrap ships. There are no immutable laws in the markets’ operation. Since markets consist of people going about their business, the best opportunities arise when the markets behave inconsistently. In addition, shipowners usually trade in all four markets, which creates a synergy between them. When the freight rates fall or rise, the changing sentiment ripples through into the sale and purchase market and from there into the new building market. Let us describe in more detail how the four markets work:

Freight markets have always existed. They were organized at a local level and the merchants negotiated with shipowners over the rates of transportation. The Baltic Coffee House was such a market. In 1883, the Baltic Shipping Exchange, the most famous freight market, was opened in London. The Baltic Shipping Exchange operated exactly in the way Jevons described above. At this institution, the merchants who wanted to transport goods met with shipowners and captains, signing “transportation contracts.” At that time, Great Britain was an Empire where “the sun never set,” so the Baltic Shipping Exchange accommodated a global market.

Today most of this business is processed by telephone or fax and not on the Exchange floors, although the disciplines of the business remain the same. Nowadays, the international freight market is unified; but, just as a country market has different sections

for pigs and cows, there are separate freight markets for different kinds of ships (tankers, bulk carriers, containerships etc.). One would expect that the freight rates are different for tankers and bulk carriers. It does not work like that. The events in the international market affect the freight rates in an integral way and all the traders belong to the same group. So, what happens in one sector eventually ripples through into the others [1, p. 81).

There are two types of transaction in the freight market: *freight contract* and *time charter*. In the first, the shipper buys transport from the shipowner at a fixed price per ton of cargo. In the latter, the ship is hired by the day. The *freight contract* suits better shippers who prefer to leave the management of the transport to the shipowner. The *time charter* suits better experienced shippers who prefer to manage the transportation by themselves. Both of these transactions (*freight contract* and *time charter*) and the people that are involved compose the *charter market*.

The *charter market* is a very important part of the shipping industry. A list of common chartering terms is given in the Glossary on Appendix I. Many shippers prefer to hire a vessel rather than own it. The decision for a shipper (e.g., an oil production company or the Hellenic Army) to own merchant ships or hire them depends on various reasons that will be discussed below. On the other hand, ship owners buy second-hand ships or build new ones in order to trade their transportation capacity. They do that either by taking the responsibility for transporting a certain volume of cargo for an agreed fee per ton (voyage charter / contract of affreightment) or by chartering the whole vessel to the shipper / charterer for a certain period of time at an agreed fee per day, month or year (time charter).

The chartering procedure is not very different from any other hiring or subcontracting operation. The parties that participate in the procedure include the following:

- The *shipowner* that comes to the market with a particular type of ship free of cargo and is ready to negotiate the transportation capability that he is offering. The ship is either underway or anchored immediately available or available after a certain date. She will have a particular speed, cargo capacity, dimensions and cargo handling gear.
- The *shipper* or *charterer* who has a particular cargo that needs to be transported (e.g., 3,000 tons of construction steel from Piraeus to Limassol).

Some charters can be agreed to (“fixed”) after a direct communication between the shipper and the shipowner. But most shippers and shipowners use *brokers* in order to set up deals. After the brokers receive a request from their client, they use their extensive network of contacts and they try to fix the vessel. Since contacts are important, *brokers* like to operate in an established shipping center — like Piraeus, London, Hong Kong, or New York etc.

The charter market can be divided into five categories: voyage charters or “spot market,” contracts of affreightment, time charters, bareboat charters and pool employment. As far as the shipowner is concerned, the main difference is how much he is involved in the shipping operation, the division of costs, and how much detail is specified in the contract.

The *voyage charter* or *spot market* is a pretty straightforward business transaction. A single voyage charter usually appeals to a shipper who has a specific cargo to ship and who does not want to get involved in the shipping operation. The chartered vessel earns income for each individual voyage. Earnings are dependent on prevailing market conditions at the time the vessel is “fixed,” which can be highly volatile. Idle time between voyages is possible depending on the availability of cargo and position of the vessel. Vessels operating on the spot market generate revenues that are often more volatile than those from other types of shipping. An example of voyage charter is as follows: the Hellenic Army wants to ship seventy tanks from Thessaloniki in Greece to Karachi in Pakistan. They will call a broker and the broker will “fix” (i.e., charter) a ship for the voyage at a fixed freight rate per vehicle or per ton of cargo. The terms will be set

out in a charter agreement and, if all goes well, the ship will arrive in Thessaloniki on the due date, the cargo will be loaded, transported to Karachi, unloaded, and the transaction is complete.

In cases where the voyage will not be completed according to the terms of the charter agreement, there will be a claim. For example, if laytime (i.e., port time) in Karachi is specified at two days and the time spent in port is four days, the owner sends a claim for two days demurrage to the charterer (Hellenic Army). If the ship spends one day in port, the charterer (Hellenic Army) will submit a claim for one day dispatch to the owner. The rates of dispatch and demurrage will be stated in the charter agreement.

Sometimes the shipowner wants to have the freedom of choice to use whichever ship he wants and not be compelled to use a specific vessel. In this case, he is doing business on the basis of a fixed price per ton of cargo transported and he is not required to say which ship he will use. He then makes a *contract of affreightment*. On the other hand the shipper – for example the Hellenic Air Force – might have an obligation to ship one thousand tons of fuel every three months from the port of Patrai in Greece to the port of Heraklion in Greece for year 2009. In this case, the charterer (Hellenic Air Force) would like to arrange for the shipment in one contract and leave the details of each voyage to the shipowner.

In a *time charter*, many of the costs and commercial responsibilities are transferred to the charterer. The shipowner is still required to “pay” for the ship’s daily costs (i.e., the crew, maintenance etc.) but the charterer is responsible for the commercial operations of the vessel (i.e., bunkers, canal dues and port charges). Chartering lasts for a specified period, which could be anything from the time the ship requires for a single voyage, to some months or some years. The shipowner is also required to provide a warranty regarding the vessel’s performance (i.e., speed, fuel consumption, etc.), and the charter party must also describe the conditions under which the charterer must not pay for the vessel or in other words the vessel is regarded as “off hire.” Long-term charters must also include agreements in case that a ship is laid up, or the conditions under which the charterer is entitled to terminate the arrangement - for example, when the shipowner fails to run the ship efficiently. A time charter is comparable to an operating lease.

With a *bareboat charter*, the shipowner is completely inactive in the operation of a vessel. He purchases a ship and hands it over to the charterer who completely manages the vessel and pays all operating and voyage costs. In this case, the shipowner is not required to have any shipping or maritime skills. A bareboat charter is comparable to a capital lease.

Finally, in the *pool employment* the vessel is part of a fleet of similar vessels, brought together by their owners in order to exploit efficiencies and benefits from a profit-sharing mechanism. The operator of the pool sources different cargo shipment contracts and directs the vessels in an efficient way to service these contractual obligations. Pools can benefit from profit and loss-sharing effects and the benefits of potentially less idle time through coordination of vessel movements, but vessels sailing in a pool will also be vulnerable to adverse market conditions.

From the above, we conclude that starting from the voyage charter and finishing at the bareboat charter, the shipowner's involvement in the maritime operations diminishes. However, no matter which type of chartering agreement is reached, the contract prepared is very important. It is called *charter party* and it specifies all the terms and conditions on which the business will be done. The shipping environment is very volatile, and even in a single voyage from the port of Seattle to a port of Japan a lot of things might happen.

This is why the charter party or cargo contract is a very important document in the shipping business. It must be written very carefully in order to protect the position of the contracting parties. Since it would be time consuming for the participants to develop a new charter party for every contract, the shipping industry has developed standard charter parties that apply to the main trades, routes and types of chartering arrangement. In Appendix II is an example of a basic general charter party, which is called BIMCO "Gencon." It consists of two parts: Part I is a schedule that sets out details of the charter and Part II sets out the standard terms. Usually we specify the charter party that is going to be used when the order is quoted. This is to avoid subsequent disputes over contractual terms. Since there are so many variants, there is no definite list of party of charter party clauses. If we use the "Gencon" as an example, we can see six major components:

1. Information about the ship and the contracting parties. The charter party will specify:

- Name of the shipowner / charterer and broker;
- Details of the ship – including its name, size and cargo capacity;
- The ship's position; and
- The brokerage fee, stating who is to pay.

2. Description of the cargo to be carried. Attention should be drawn to any special features. The name and the address of the shipper are also given, so that the shipowner knows whom to contact when he arrives at the port to load cargo.

3. The terms and conditions on which the cargo is to be carried. This part defines the commitments of the shipowner under the contract. It covers:

- The dates on which the vessel will be available for loading;
- The loading port;
- The discharging port including details of multi-port discharge where appropriate;
- Laytime;
- Demurrage rate per day; and
- Payment of loading and discharge expenses.

4. The terms of payment. This is important because very large sums of money are involved. The following must be specified:

- The freight to be paid;
- The terms on which payment is to be made; currency and payment details are also specified;
- Penalties for non-performance: this is specified in detail in Part II of the contract; and
- Administrative clauses, covering matters that may give rise to difficulties if not clarified in advance. These include the appointment of agents and stevedores, bills of lading, provisions for dealing with strikes, wars, ice, etc.

All charter parties follow the same general principles. Time charter agreements might include boxes to specify the ship's performance (i.e., fuel consumption, speed, quantity and prices of bunkers on delivery and redelivery) and equipment, and might exclude the items dealing with the cargo.

It is of great importance that the shipper and the shipowner do business quickly and fairly without legal disputes. The detailed charter agreements are a good way to provide clear guidance on the allocation of liability in the event of many thousands of possible mishaps occurring during the transportation of cargo by sea.

The charter market is highly competitive and the rates at which a ship can be "fixed" might change dramatically in a period of a few weeks or even days. The freight rates and the time charter rates follow the laws of supply and demand. If there is a shortage of merchant ships and a lot of cargo to be transferred then the rates are high and the shipowners or the ship operators make a lot of money. If there are a lot of merchant ships available and not a lot of cargo that needs to be transported, then the rates are low. This has several effects in the shipping business.

When freight rates are high (and there is a shortage of transport capacity), the older and less efficient ships become profitable and are brought back into service until the whole operational fleet is at sea. When the freight rates are low (there is an oversupply of transport capacity), the older and less efficient ships cannot find employment. They cannot cover their operating costs and move into lay-up.

Freight rates generally follow a long period of low prices interspersed by brief periods of very high prices. This is because as prices rise there is a point at old ships become profitable to operate. Then they go to the market and do business for a short period of time until there is an oversupply of ships. Then the rates fall quickly. The old ships are no longer profitable, and their value as ships often falls below the scrap price. It is then most profitable to scrap the ship. Often other owners buy the second hand ships and because of the low purchase price, they can operate them less intensively in routes that are not as profitable for other businessmen.

The sell and purchase market is mainly influenced by the freight rates. Second-hand ships' value is usually higher when the freight rates are high. On the other hand, when freight rates are low, ships' prices are lower and some shipowners are forced to contemplate ship sales to meet cash flow difficulties. It is a "well known secret" in the shipping industry that most of the money is made from the sale and purchase of ships at the right time.

The law of supply and demand also controls the shipbuilding and ship scrapping industry. According to Stopford, "the following six influences can be expected to have particularly important roles to play in explaining the supply and demand functions for merchant ships:

Demand influences:

- Shipping freight rates
- Market expectations
- Credit availability
- Supply Influences:
- Shipbuilding capacity
- Shipyard unit costs
- Production subsidies"

For the demand side, high freight rates encourage ship owners to build new ships. The question is whether freight rates will continue to be high in the future. Since the building of a ship takes more than a year and freight rates may change dramatically in a month's period, market expectations influences shipbuilding demand. Finally, credit availability encourages shipowners to build more new ships even if they do not have the internal financial resources to do so. If credit availability is short, only those shipowners that have the internal financial resources to purchase a ship do so, and shipbuilding demand accordingly decreases.

Supply is influenced by the international capacity of shipyards to build ships. There are a certain number of shipyards that are operational and there must be a certain

number of ships that are financially viable for each yard to produce at the prevailing price level. The output level depends on the shipyard facilities, but also on the input of labor and the labor productivity.

The bottom-line is that actual unit cost will determine whether the shipyard will sell any more ships. Sometimes unit price is subsidized by the government or other financial institutions. The underlying logic is that the state has wishes to keep the shipyards running so that the workforce will not lose their job keeps. In this way, social problems and unrest are avoided. If there is a demand in the market, then the shipyards have a greater incentive to build ships. As more and more shipyards build ships the market becomes saturated and the demand decreases. So does the production, since fewer shipyards can afford to bid for new constructions.

As Stopford mentions “scrapping depends on a balance of a number of factors that can interact in many different ways. The main ones are age, technical obsolescence, scrap prices, current earnings and market expectations.”

The factor of age is quite relevant. However, as long as a ship is useful and profitable, there is no reason to scrap her no matter how old. Lloyd’s Demolition Register [1, p. 80) contains ships that were scrapped at the age of sixty or seventy years. On the other hand, some were scrapped at ten years of age.

Technical obsolescence is quite an important factor, and we can see a peak in the number of ships sold for demolition associated with an innovation in ship design. For example we see a high scrapping rate of multideckers in the late 1960s when those ships were made obsolete because of containerization.

Scrap prices are also an important factor that influences the shipowners decision to sell a ship for demolition. The market for scrap metal is quite specialized and prices fluctuate widely [1, p. 80]. They depend on the demand for scrap metal and the quantity that can be offered from resources such as ship breaking or the demolition of vehicles.

Finally, the scrapping of a ship depends on the shipowners’ expectations about the market in the future. Scrapping a ship is an important business decision. If the shipowner expects that the freight rates will rise in the immediate future, then it is very likely that he

will keep the ship because the profits in the future freight boom will be so great that they will justify incurring a small operating loss for a time.

D. CARGOES

Seaborne trade includes all kinds of products. However, four commodities – oil, iron ore, coal and grain –account for two-thirds of all seaborne trade [1, p. 8]. The other cargoes are agricultural; chemical and forest products; ores such as bauxite; and industrial materials such as rubber, cement and textile fibers. The diversity of the cargoes has led to a diversity of ships and their cargo handling equipment.

The wide variety of cargoes that need to be transported initiated the creation of the *Parcel Size Distribution Function (PSDF)*. A “parcel” is an individual consignment of cargo for shipment [1, p.13]. For a particular commodity trade, the PSD function describes the range of parcel sizes in which cargo is transported. With this foundation, we can produce statistics and forecast the trends for each commodity. For example we might observe that iron ore is shipped in quantities that vary from 50,000 tons to 100,000 tons. On the other hand, we might observe that crude oil is usually shipped in a particular shipping route in quantities that do not go below 200,000 tons and usually are as high as 500,000 tons. The “parcel” sizes and the shape of the function depend on many different variables such as the production and consumption capacity of the businesses and the availability of the ports. The precise shape of the PSD for each commodity is determined by the characteristics of demand. The market has sorted out the economic balance between large and small parcels. This *PSD* function helps us understand a very important question in shipping: ‘Which cargoes go in which ships.’ There are two main ways that a cargo can be loaded and transported: As a ‘bulk cargo’ or as a ‘general cargo.’

‘Bulk cargo’ consists of cargo ‘parcels’ big enough to fill a whole ship. On the other hand, ‘general cargo’ is composed of smaller parcels that cannot fill the whole ship and have to be stored with other cargo in order to be transported. Usually ‘bulk cargo’ is transported by the *bulk shipping industry* while the small ‘parcels’ of the ‘general cargo’ by the *liner shipping industry*.

Most of the bulk cargoes are drawn from the raw material trades such as oil, iron ore, coal and grain. However, we assume that all these raw materials are transported as a single load in one ship. Some raw materials, such as timber, might be shipped partly as bulk and partly as consignments of general cargo. According to Stopford, there are four main categories of bulk cargo:

- *Liquid bulk, which* requires tanker transportation. Some liquid products are crude oil, oil products, liquid chemicals such as caustic soda, vegetable and olive oils, and wine.
- *The ‘five major bulks’—* iron ore, grain, coal, phosphates and bauxite — which are transported in conventional dry bulk carriers.
- *Minor bulks,* which cover many commodities that are transported in shiploads — including sugar, salt, steel products, cement, gypsum, non-ferrous metal ores, forest products and chemicals.
- *Special bulk cargoes, which* must be handled and stored with special care such as vehicles, industrial equipment and prefabricated buildings.

General cargo consists of smaller consignments that cannot fill the whole ship. These can be very different products in different sizes and quantities. The shipowner will charge according to the market’s freight rates or he might charge special rates if the cargo is difficult to handle and store. There are no definite rules regarding what the general cargo might be. It can be bales, boxes, machinery, 200 tones of steel products, 1,000 tones of soya beans and 2,000 pallets of bottled water. However, we could categorize general cargo as follows:

- *Loose cargo* which includes individual items, boxes and pieces of machinery — which must be handled and stowed separately.
- Cargo that is *heavy*, and difficult to handle and stow.
- *Refrigerated cargo,* which is stowed in insulated holds or containers.
- *Containerized cargo, which* is stowed in standard boxes 8 feet wide, 8.5 feet high and 20, 30 or 40 feet long.
- *Palletized cargo, which is cargo* packed in pallets for easy handling and loading.
- *Pre-slung cargoes, which are small items* lashed together into standard-sized packages.
- *Liquid cargo* which travels in deep tanks, liquid containers or drums.

General cargo used to travel 'loose' until the mid 1960s. Each item had to be packed in the hold of the ship using 'dunnage' (pieces of wood or burlap) to keep it in place. This operation was highly labor intensive, slow and expensive. Because of the costs, liners' profit margins were squeezed. The answer to this problem was containerization. As mentioned above, containers are boxes of certain dimensions in which individual cargo items are packed.

Nowadays, container shipping includes a wide range of goods in a unitized form. Participants in the container shipping industry include liner companies who operate container shipping services; container shipowners, often known as charter owners, who own containerships and charter them out; and shippers who require seaborne movement of containerized goods. Container shipping represents an important and increasingly significant part of seaborne movement of goods. In 2005, global container trade stood at an estimated 105 million TEU. As of September 1, 2006, the global containership fleet contained 3,848 fully cellular containerships, with a total standing slot capacity of almost 9.0 million TEU, while the total container capable fleet capacity stood at almost 11.0 million TEU [2].

The *bulk shipping industry* is mainly composed of shippers that own ships and the shippers that charter ships. Usually industrial concerns such as oil companies, aluminum plants and steel mills become shipowners because they ship substantial quantities of bulk materials themselves and do not want to depend on a market with fluctuating freight rates. In addition, ownership means ships can be designed to provide shipping of needed cargoes at minimum cost. Other shippers who have long-term requirements for large quantities of bulk cargo and do not wish to own ships arrange long-term charters. Those contracts are usually placed before the vessels are built. However, it is often the case that shippers need only one shipment. Then a bulk or tonnage is chartered for a single voyage via some market such as the Baltic Exchange at a negotiated freight rate per ton of cargo carried. Charter rates are strongly influenced by the demand for, and supply of, vessel capacity because of the highly competitive nature of the market. Bulk carrier charter rates are very sensitive to these changes in demand and supply and consequently are volatile.

The ships that are most used for bulk transport fall into four groups: tankers, general-purpose dry bulk carriers, combined carriers and specialist bulk vessels. Tankers and general-purpose dry bulk carriers are of more or less standard designs. The combined carriers can carry both dry bulk and liquid cargo. Finally, the specialist vessels are constructed to meet specific characteristics of difficult cargoes.

The companies of the *liner shipping industry* provide transportation services between specific ports. They charge specific freight rates for each type of cargo, though discounts might be offered for regular customers.

According to Stopford there are certain tasks that the liner operator must accomplish and they make his profession more complex than that of the bulk shipowner:

- Offer a realistic regular service for many small cargo consignments and process the paperwork;
- Charge the shippers enough to make a profit. This is not an easy task when many thousands of consignments must be processed each week;
- Load the ship in so that the different consignments of cargo are easy to unload in many different ports of call. The ship must also be 'stable' and 'in trim';
- Run the ship on a 'punctual' schedule while allowing for all the normal delays arising from adverse weather, breakdowns, strikes, etc;
- Take into account scheduled maintenance and unscheduled repairs of existing vessels, the construction of new vessels, chartering of additional vessels to meet cyclical requirements, and supplement the company's fleet in order to maintain continuous service.

All of the above make the liner business a different world from bulk shipping. The skills, expertise and organizational requirements are different, and this is why certain companies have specialized in liner shipping while others specialize in bulk shipping.

Global liner trade, especially with containerships, is widespread over a range of long-haul, regional, and intra-regional routes. The "main lane" container volume on the major East-West routes is the world's largest, with the Transpacific forming the world's largest container trade. It had seventeen percent of the total volume in 2005, followed by the Far East-Europe trade and the Transatlantic. In addition, there are "intermediate" trades on the main lane East-West corridor serving the Middle East and the Indian Sub-

Continent. North-South trades form the second layer of the global liner network, connecting the Northern hemisphere with South America, Africa and Australasia. Additionally, there are also important intra-regional container routes such as the Mediterranean and the Baltic and North Sea routes.

E. SHIP DESIGNS

Shipowners have to make very important decisions about the ship types they will purchase. The type of vessel chosen will have to compete with other vessels in the market for the available charter offers. The most important influences on these decisions can be summarized as follows:

- *The cargo type* that the vessel will potentially transport. The cargo's physical and commercial properties are very important. Usually a type of cargo can be transported by several types of ships. For example, crude oil can be carried in a specialist tanker or a combined tanker; dry bulk can be carried in a conventional bulk carrier, an open hold bulk carrier or a combined carrier.
- *The type of shipping* that the shipowner intends to do. The design criteria for *long-term time charters* will likely be different from vessels that will be used in *spot charter market operations*. The former will be optimized for a specific operation while the latter will be more suitable for a wider range of business. Finally, a ship that is used for *liner operations* must meet the specifications of her trade, such as the safety and environmental standards associated with ports of call.
- *The commercial philosophy* of the shipowners. Some shipowners might choose a vessel that is more flexible. In this way, the shipowner reduces shipping risk. Others might choose highly specialized ships designed for efficient carriage of a single cargo type, offering greater efficiency or lower costs but sacrificing flexibility.

The ships of the *Dry Bulk Trades* are designed to offer inexpensive mass transportation to a wide range of commodities such as grain, iron ore and coal and toxic chemicals. The main designs in the bulk trade are the following:

- The *tweendeck tramps* are typically of 8,000 – 20,000 dwt and are designed with a tweendeck that enables them to carry either a full load of bulk cargo or general cargo.
- The *general purpose* bulk carrier can be from 10,000 to 300,000 tons. They are single deck ships with a double bottom, vertical cargo access through hatches in the weatherdeck and a speed typically in the range of

13-16 knots. Nowadays, the big majority of the minor bulk cargoes are transported in these bulk carriers.

- The *open hold (or conbulker)* bulk carriers differ from general purpose bulk carriers because they have larger hatches which make the loading and unloading faster and easier. In this way, difficult to handle cargo, such as rolls of paper, steel products, pre-slung timber, cars loaded in pallets or containers can be handled more easily. The deck is a vital part of the ship's structural strength, and for this reason the conventional hatches are generally 45-50 percent of the beam and 65-75 percent of the hold's length. The '*conbulk*'s that have larger decks are strengthened in other parts of the ship — which increases acquisition cost.
- The *combined carriers (OBOs)*. These ships are designed to transport a full cargo of dry bulk, e.g., ore, coal, grain, phosphates, etc., or a liquid cargo such as crude oil. This offers the flexibility to earn revenue in both the tanker and the dry bulk markets.

The following types of ships transport bulk liquids:

- *Crude oil tankers* are one of the most common types of specialized bulk carriers. They can be of considerable size (up to 550,000 dwt). For safety reasons the holds are subdivided into compartments to maintain stability and restrict the movement of cargo at sea. Even though no shipborne cargo loading facilities are required, most tankers discharge with their own pumps.
- *Clean product tankers* are very similar to oil tankers but generally smaller (30,000 -55,000 dwt). They usually have more parcel tanks to allow carriage of different products. Their tanks are painted with special coatings to prevent cargo contamination. Accordingly, they tend to last longer than crude tankers. Their average life cycle is 20-30 years. They can also be used for transportation of crude oil.
- *Chemical tankers* vary according to the chemicals or liquids they carry. According to Stopford, five categories of products travel in those ships: molasses, animal and vegetable oils, lubricating oils, and organic and inorganic chemicals.
- There are two main types of *liquid gas tankers*: Liquid Natural Gas and Liquid Petrol Gas. The difference between LNGs and LPGs is mainly in temperature. LNG requires extreme refrigeration (-163°C) while the LPG requires (-51°C) or equivalent pressure. One exception is ethylene, which needs (-104°C) and usually travels in small ethylene carriers. However, there are larger ethylene carriers, which are hybrid ships capable of carrying both LNG and LPG. Because of the expensive shore refrigeration installations that are needed, chartering or ownership of the liquid gas tankers is generally undertaken after careful planning.

Specialty dry bulk cargo ships are used for carrying cargoes that present stowage or handling problems. The main categories could be described as follows.

- *Ore carriers are designed for high-density cargoes.* For example, iron ore stows at approximately 0.5 m³ per ton, compared with a normal bulk cargo's 1.3-1.4 m³ per ton.
- *Forest products carriers* are designed for low cargo density. Forest products stow at 2.3 m³ per ton for pre-slung timber, and 2.8 m³ per ton for logs. In addition, heavy units are difficult to handle in a conventional bulk carrier or 'tweendecker.' Nowadays, forest product carriers are large, open-hold bulk carriers, with extensive handling gear that allows pre-slung timber, pulp and paper to be loaded and stowed by crane.
- *Cement carriers.* Cement is a difficult and dusty cargo to handle. For this reason cement carriers incorporate pneumatic handling gear with totally enclosed holds and moisture control systems.
- *Vehicle carriers.* They are multiple-deck (4 to 10 decks) with high cubic capacity to dwt ratio (e.g., one car per 3 dwt), high speed (around 20 knots for the bigger ones) and roll on, roll off loading and discharging facilities.
- *Refrigerated vessels.* These vessels were developed in the late 19th century in order to carry meat from New Zealand and Australia to the United Kingdom. Since then, the vessels have developed as along with advances in refrigeration technology, as well as loading and unloading equipment. A lot of refrigerated products are also carried by containerships with refrigerated containers, by cargo liners with over 50 percent refrigerated space, or Ro-Ros.
- *Heavy lift vessels.* There is a demand for vessels that can carry very large load units (e.g., up to 500 tons) on routes where liner companies do not offer heavy lift capabilities. The designs include float-on and conventional crane-loading using Stulken cranes.

The ships for the *Liner Trades* are designed to carry different kinds of cargo. Some of the ships currently used in the liner trade are the following.

- *Traditional multideck cargo liners* were designed to carry a variety of small cargo units. They have two twin decks for mixed general cargo, tanks for carrying liquid parcels and refrigerated capacity. Extensive cargo gear with heavy lift ability is also a main characteristic of those vessels. The disadvantage is that these vessels require time and labor to load and discharge cargo. Traditional cargo liners typically spend almost half of their time in port and the labor cost of handling cargo is very high.
- *Sophisticated multipurpose cargo liners* responded to the need for more sophisticated cargo carriage modes. Those vessels can carry general cargo

and liquids, but they also have advanced container handling systems. However, these ships are expensive to build.

- *The container ships* are specifically designed to offer fully containerized service. There are no multiple decks and there is a wider cell construction with cell guides in the holds and strengthened hatch covers -- allowing containers to be stacked above deck. The design of those ships centres on container dimensions. Containers have standard dimensions (20 or 40 feet length and 8 or 8.6 feet height) and that is important for their transportation with ships as well as with trains and trucks. One important technological development was *refrigerated containers*, which gave containerships versatility and made possible the transportation of refrigerated products such as meat, dairy products and fruit.
- *Ro-ro ships* handle small bulk and heavy awkward cargo. They have been economically viable since the late 1960s. They have stowage spaces for vehicles (cars, tractors, loaded trucks or trailers, etc.), plus containers and cargo that can easily be handled by a fork-lift truck (pallets, bales, containers, packaged timber etc.). Their ramps permit unloading in ports without advanced handling facilities – which is quite useful for trade for third world countries. Disadvantages include the slow pace of loading and unloading (compared to containerships), the need for careful stowage planning, and the lack of simple intermodal integration – a major advantage of the containerships.
- *Barge carrying vessels (BCVS)* are not in use as much in the West as they are in Russia because of its vast East-West seaways. The barge-carrying system was developed in the 1960s and it is based on grouping a number of ‘floating holds’ (i.e., barges) within a single ship. The barges can be filled with general cargo or small parcels, which gives them considerable flexibility in terms of the range of cargoes carried. They are generally 400-1,000 tons.

Finally, the dimensions of modern merchant ships, no matter of the area of their trade (bulk or line), are categorized as follows:

- *Handymax*: Vessels with a cargo capacity of 45,000-46,000 dwt.
- *Panamax*: Vessels with a cargo capacity of 65,000 dwt. Their beam cannot be greater than 32.2 m which is the width of the Panama Canal.
- *Aframax*: Vessels with a cargo capacity of 65,000 dwt.
- *Suezmax*: Vessels with a cargo capacity of 150,000 – 200,000 dwt. Those vessels should conform to the draught restrictions of the Suez Canal.
- *VLCC/ULCC*: Vessels (usually tankers) with a capacity of more than 200,000-250,000 dwt.

F. ECONOMIC VARIABLES THAT AFFECT THE FINANCIAL PERFORMANCE OF SHIPPING COMPANIES.

Like all the other businesses, shipping companies try to make profits during the succession of market booms, recessions and depressions. During booms, when cash flow is high, they invest in order to cope with 'bad times,' and not be forced to sell ships for scrap. During recessions, some will not make it, and those who survive will profit when booms come again. In addition, companies with strong cash flow will be able to buy ships cheaply during bad times and sell them for a profit during the good times. The three key variables that influence shipowners' cash flow are the following [1, p. 153):

- the revenue received from chartering / operating the ship;
- the cost of running the ship;
- the method of financing the business;

The revenue from cargo transportation depends on current freight rates. Those are not controlled by the shipowners. The shipowners can control other variables -- such as increased capacity for economies of scale, good operational planning for increased productivity, reduction of backhauls, minimization of time of hire, improved dwt utilization and reduction of handling time.

The main cost categories of running a ship are operating costs, voyage costs, cargo handling costs, and capital costs. Operating costs are the everyday expenses of the ship, such as crew, stores and maintenance. These will occur regardless of the trade the ship is engaged in. Some companies include periodic maintenance costs in the operating costs. These usually take place at the time of the ship's special survey. Since they do not occur continuously like most operating costs, we prefer to treat them separately. Voyage costs have to do with the particular voyage -- including fuel, port charges and canal dues. Capital costs depend on the way the ship has been financed. Payments on debt and interest cannot be avoided (fixed costs), while returns, equity and dividends are discretionary (variable) costs. Finally, cargo handling costs represent the expense of loading, stowing and discharging cargo. Those costs are especially important in the liner trade.

The shipowner makes important decisions, which shape future costs. The choice between new and old ships, flexible or specialized ships and debt or equity finance all make a difference. They influence the costs of a ship, and once taken the owner is very much at the mercy of the market and his bankers. He can use his business and management skills to optimize cash flow on a day-to-day basis through efficient ship management and resourceful chartering, but major cost and revenue items are beyond his control.

Daily costs are higher for older ships because of required maintenance for the ageing propulsion plant, regular steel replacement of rusty hulls and higher fuel consumption due to older design engines and hull design. High revenues are not only a result of cutting costs. Clever chartering and flexible ship design minimize the ship's idle time and ensure that the vessel is earning maximum possible revenue. Financing strategy is also crucial. Debt must be paid regardless of market's condition. If the ship is financed mainly by outside equity or the shipowner's cash, there are no fixed payments. The bottom line is that if a shipowner has limited personal funds to invest, the choice is between an old ship with high running costs (and no debt) or a new ship with lower running costs (and a mortgage).

G. THE FINANCING OF SHIPS AND SHIPPING COMPANIES

Ships are big capital investments. Containerships cost up to \$150 million and LNGs up to \$250 million each. In addition, shipping businesses often lack transparency and audited financial information is not always available. Because of volatility of market conditions, ship values change up to 60 percent in a few months [1, p. 194], and the owner, his bankers, might lose millions if something goes wrong. Ship financing is a big aspect of the shipping business. We will examine how ship finance fits into the world financial system. We will also examine the different financing options that are open to the shipping companies.

The current schema of financing is not unique to the shipping industry. Money can come from corporate or personal 'savings.' There are companies with spare cash to

invest, private investors who manage their own investments and investment managers who manage the assets of insurance companies, pension funds, savings banks, banks, trust funds and finance houses.

Regardless of source, funds are traded in the money market (domestic or international) where short term debt agreements are made. Long-term domestic or international bonds issued by companies or governments are traded in the capital market. Trade in the shares issued by companies takes place in equity markets. Finally, shipowners might bypass markets and arrange debt or equity finance directly with the lenders through private placement.

The institutions that arrange ship finance are generally commercial banks that provide loans for up to 10 years. For a big loan, several banks might form a syndicate. The commercial banks borrow in the financial markets and lend to shipowners at a profit ('spread'). They use their specialized knowledge to identify shipping investment opportunities with an acceptable risk. Other banks that provide money for financing the shipping business are mortgage banks and merchant banks. Mortgage banks provide loans by using the ship as collateral. Merchant banks (known as investment banks in the United States) arrange loans, public offerings of equity, private placements and bond issues. The finance houses of Europe, small business investment companies, and venture capitalists in the United States provide loans from their own funds. Finally, leasing companies provide money for shipowners through conventional leasing methods.

One of the oldest and most 'traditional' methods of financing in the shipping business is equity. When the shipowner uses this method, he is looking for investors who will take a stake in the company -- sharing the risks and receiving the rewards. Currently there are four different methods for raising equity -- owner's equity, limited partnerships, ship funds, and public offerings.

The owner's equity is personal that the shipowner or his family members and friends invest in a new ship. The importance of owner's equity varies from company to company.

The public offerings of shipping companies are quite similar to public offerings of other corporations. A lot of stock exchanges such as the Athens, New York and Stockholm Stock Exchanges trade stocks issued by shipping companies. Public stock issues are handled by merchant banks (investment banks) which prepare the prospectus, submit it to the stock exchange authorities, gain approval for the issue and place the shares with investors. The success of a public offering depends on the number of investors that want to buy the company's stock. Good corporate structure, well-defined strategy, good management and plenty of information are helpful. Not all public offerings are successful. The nature of the shipping business, its high volatility and the agency problem are preventing a lot of investors from investing funds. However, shipping is a key business of the world economy and financial institutions have a place in their investment portfolios for equity interests in well-managed transport companies.

The partnership structures were popular in Norway in the 1980s because of the high taxation and the fact that shipping partnerships offered tax advantages to investors, provided that the profits were re-invested within a certain period of time. In Norway, the partnerships were usually set up on a one-ship basis with the management subcontracted. The organizer generally appoints a 'general partner' who provides 10 percent of the capital. In order for the tax benefits to apply, the equity capital had to be above 70 percent of the cost of the project (i.e., purchase price of the ship plus working capital). According to the Norwegian law, at least 20 percent of the committed capital had to be available in cash at the time of the incorporation and another 20 percent within two years. The remainder was only called if needed. In the early 1990s, the tax benefits in Norway were reduced, and the partnerships earned a mixed reputation after a series of losses. There was also the problem of limited regulation — which increased risks investors, especially those not expert in the shipping business. The partnerships accordingly declined.

Finally, 'ship funds' are a popular way of raising equity for short term speculation on ships' value. Such funds proved extremely successful when the ships' prices were low. With ship funds, ships can be bought low and after a successful speculation they will be sold high, bringing profit to the investors. Usually, the fund is composed of 40 to 60

percent debt in order to leverage the investment. The shares are generally sold by private placement to wealthy individuals, financial institutions or sometimes to the general public. Ship funds face two important problems. First, the equity must be raised before the ships are purchased and the organizers accordingly have a limited time to find appropriate ships. Second, they treat the ships as commodities and the main goal of the fund managers is profit through appreciation of the ships' value. This does not make them good shipping operators because ships are complex engineering structures and should not be treated as short-term holdings.

Debt is another way of financing the shipping industry. Borrowers raise funds while retaining full ownership of the company. There are four types of debt: bonds, commercial bank loans, shipyard credit, and private placements.

The procedures to issue bonds are the same as for all the other companies. The shipping company must obtain a credit rating from Moodys or Standard and Poors — which depend on good business structures that analysts can understand, sound management, and a convincing business strategy. It usually takes several months for a bank to organize the deal, draw up the documents and place the bonds in the market.

Commercial bank loans are the most common means of debt financing for shipping companies. There are several banks worldwide that have shipping departments in order to close deals with the shipping industry. The procedure is straightforward. The shipowner and the loan officer discuss the terms and conditions of the loan and whether the business plan is a good one; if so, the loan officer will approve the loan. The approval might only take a few days if the shipowner and the bank have a long-term business relationship, or it can be a lengthy process for risky loans. The five key aspects of a shipping loan [1, p. 211] are the *tenor* which is the period of the loan, *interest rate* (shipping loans usually have a fixed spread above the banks' funding cost), *fees* which are the charges for arranging and administering the loan, *collateral* (assets or funds to which the bank has legal access if the borrower defaults) and the *covenants* which are the terms and conditions that the borrower must comply with, as well as the rights of the bank if he defaults. The interest rate spread usually reflects a credit judgment, and may vary from 0.5 to 2 percent above the banks' interest rate.

The shipping loan officer has two tasks: first, to review the cash-flow projections; and second to ensure that there is sufficient security available to compensate the bank if the borrower defaults. The cash-flow projection and analysis is easier if there is a reliable time charter available, which will guarantee a future income to the borrower. As far as security is concerned, usual practice is for the shipowner to establish *a one-ship company* for each vessel financed and assign the first mortgage on the ship to the lender. This practice protects the other ships that the ship owner might possess in case he cannot service the loan. On the other hand, the loan officer has an asset available to compensate the bank in case of default. He estimates the current and future value of the ship and issues a percentage of the ship's value as a loan. Ship's value depends on the age of the ship and market conditions. Some banks do not issue loans higher than 50 percent of ships value. However, banking is a competitive business. So, if a bank offers 80 or 90 percent, then that will be the current market finance practice. In exceptional cases, banks might offer to finance 100 percent of the ship's cost.

Big shipping corporations with well-defined corporate structures often prefer to borrow as a company because it is inconvenient and time consuming for them to borrow against individual ships. Large loans are almost always syndicated among several banks and usually incorporate covenants to ensure that the company maintains a strong balance sheet. Normally, those covenants cover leverage rate, earnings to ratio rate and asset cover.

Most lenders prefer not to keep big loan transactions on their books. For this reason, some banks set up syndication for large shipping loans. In this way they spread the risks and the profits. Generally, all participating lenders are knowledgeable about the shipping industry. Sometimes there is a lead bank with sufficient knowledge of the industry which acts as the liaison between the lenders and the shipowner. Syndication is not an easy and involves a great deal of organizational skills by the leading bank. This is why most big banks that are involved in shipping have a syndication department. According to Stopford, a usual timetable for syndicating a loan is as follows:

- The lead bank that meets with the customer to discuss his financial needs. Then the bank's syndication department discusses the terms and conditions of the loan with the other banks. If the other bankers agree with

the initial proposal, they underwrite the loan. If not, the loan will be offered on a 'best effort' basis. If the borrower agrees, he will issue a mandate letter.

- The next step is preparation for syndication. The syndication department of the bank will prepare draft documentation and an Information Memorandum designed to answer questions that are likely to be raised by the participating banks. In order to do that, it works with the bank's shipping department and the bank's credit control officers.
- When the preparation is complete, the terms and conditions of the loan will be circulated to the other banks that expressed an initial interest. The lead bank will also visit the other banks in order to discuss the proposal. The other banks make their own inquiries because the proposal must be approved through their own credit control systems. Then they indicate the sum that they are willing to contribute; and if the borrower agrees, the documents will be signed.
- The processing and administrative fees charged are a matter of negotiation among the participating banks. The lead bank will usually charge an agent's fee. For large syndications, a management team might be created whose task is to administer the loan without approaching every participant.

A syndicate might take months to organize, and this is a drawback. The shipowner might not be in a position to wait for such long.

Banks that have issued shipping loans might sell them to other banks. This is commonly called 'asset sales' and is a way for the banks to reduce their exposure to shipping risk. The bank that has initially issued the loan will continue to manage it and the shipowner might never know that his loan is now held by another bank(s).

Debt can also be arranged by private placement. The ship-owner will discuss the possibilities of being financed by insurance companies, leasing companies or pension funds. Since this is a one-off deal, it can be expensive and only companies with good corporate structure and credit worthiness can expect favorable terms.

Debt financing of new construction has several drawbacks. The initial capital cost of a ship is often too high to finance it with cash-flow from its likely spot market earnings in the next 5 to 10 years. Secondly, the loan is needed before the ship is built. That means that the hull is not available as collateral. However, in periods of recession shipyards are keen to win orders and governments want to support the ship-building industry. For this

reason, the shipyards cooperate with local commercial banks in order to finance the building of new ships. The governments intervene in the process to make shipbuilding credit more attractive as follows [1, p. 217]:

- *Government guarantee:* The government guarantees the credit terms of the loan. In this way the shipowner can get better credit from the commercial banks. In doing so the government takes a credit risk, in effect a subsidy.
- *Interest rates subsidy:* Often the government subsidizes the interest rate of the commercial bank. For example if the market interest rate is 10 percent and the shipowner is offered an interest rate of 8 percent, the government will subsidize the difference of 2 percent.
- *Moratorium:* The government might implement a moratorium on interest or principal repayments that might last one or two years.

Governments around the globe have different ways for handling shipyard credit. More centralized economies like the Japanese, have government banks to carry out the credit analysis and make the loan. Other governments have an agency that performs the credit analysis, but the loan is provided by local commercial banks.

Depending on government and shipyard policy, the agreement with the shipowner might require pre-delivery financing. Pre-delivery financing is sometimes quite risky for the lender because the shipyard might go bankrupt or there might be unrest (e.g., strikes) in the area where the shipyard is located. Under the above circumstances, the ship might remain unfinished and the lender will have no collateral. In situations like this, another form of security has to be found. There might be a 'refund guarantee' issued by the shipyard's bank; and in such situations the government's guarantee is very much appreciated by the lender, the shipyard and the shipowner.

Post-delivery finance is sometimes used; it can be obtained from a shipyard credit scheme, commercial bank credit, or leasing. Since shipyards generally require 'stage payments' from their customers, the shipowner will have to pay from his own equity or other resources during the first stages of the ship's building (keel laying, engine delivery and launching). However, shipyards need the business and have tight relationships with their governments might agree to build the ships with little or no cash-flow in the first stages of the construction.

Leasing of ships has also been used. Leasing of property, buildings and heavy industrial equipment has been a very common commercial practice. The lessor, who is the owner of the property or the equipment, hands it over to the lessee, who is free to use it as if it were his own. According to the agreement, the lessor receives regular payments from the lessee. In the leasing transactions there are three main risks to consider [1, p. 217]: (1) the revenue risk (the lessor not being fully for the asset), (2) the operating risk (unexpected breakdowns), (3) the residual value risk (disposal revenues being less than expected). There are two common types of lease currently in use. The *operating lease* and the *capital or finance lease*. The *operating lease* is a short term agreement for usage of the equipment by the lessee. Maintenance is carried out by the lessor, and at the end of the lease the equipment goes back to the lessor's custody. In an *operating lease* the lessor bears most of the risk.

The term of the *capital or finance lease* is longer and usually covers the bulk of the asset's life. The lessor is mainly the financier and is not involved in the operation and maintenance of the asset. In the event of a sudden termination of the agreement, the lessee must usually compensate the lessor. In addition, if certain conditions are fulfilled by the end of the agreement, the ownership of the asset might be transferred to the lessee.

In shipping, most leases are *capital*. The lessor usually purchases the ship from a shipyard, and for that he gets a loan from a commercial bank. The loan might cover 80 or 90 percent of the ship's value. Because of the loan payments and the asset's depreciation, the lessor usually gets good tax benefits. On the other hand, the lessee does not present any liabilities in his balance sheet since he does not own the ship. The main issues that might rise between the lessor and the lessee in an operating lease are a change in the tax legislation, the fulfillment of the lessee's obligations as far as the cash-flow is concerned and the decision of the lessee to sell the ship which would require the complex process of unwinding the lease. Because of the reasons stated above, the paperwork for lease transactions is complicated and leasing works best when there is a well defined long-term requirement for the ship and well established shipping corporate.

Banks are very important institutions in the shipping industry. When they pump money in the market we see new orders for new construction as well as acquisition of

second-hand ships. However, a shipping portfolio is very volatile and the shipping departments of banks need to be careful when they manage a portfolio whose main source of security, the ship itself, is volatile in price. Assets distribution is a good strategy because the same rules apply in shipping investments as the ones that are very well known in high risk stocks management.

H. MARINE INSURANCE

The mechanism that allows goods to be transported with acceptable risks for both the shippers and the carriers is marine insurance – which is a very specialized business. There are special brokers who negotiate the terms and conditions of insurance between the insured and the insurer. A cargo is insured for a particular voyage through a *special policy*. An *open policy* provides coverage all the goods a particular shipper sends to many different destinations.

There are many more variations of marine insurance that depend on the *terms of sale* between the buyer and the seller of the goods. The *terms of sale* determine the shipper and under the *Free on Board (FOB)* and *Cost, Insurance and Freight (CIF)* the shipper pays for insuring the cargo. If the *terms of sale* are cost and insurance (C&I), then the seller is responsible for the insurance while the buyer is the shipper. If the sale terms are cost and freight (C&F) then the seller is the shipper and the buyer takes care of the insurance.

In order to obtain insurance, the responsible party will submit all the information about the cargo and the required insurance coverage to the broker. The broker will then forward the information to the insurer who will assess the risks involved and then accept or decline the offer. In addition, he will specify under what conditions and for what premium he will insure the cargo. If the shipper agrees to the terms and conditions of the underwriter, then both of them as well as the broker will sign the original application which now becomes a ‘binder’ for both parties until an appropriate policy is issued creating specific bilateral obligations.

As Abrahamson mentions, “... marine insurance represents a contractual obligation to both parties...” and for this reason all the regulations of contract law apply.

The contract must result from an offer and an acceptance; consideration must pass between the two parties; the intention must be to create legal obligations; the object of the contract must be legal; and the contract must be capable of performance [3, p. 96]. The contract is voided if the above or some other conditions (such as insurable interest, good faith and implied and expressed warranties) are violated.

An insurable interest is the material interest that the purchaser of insurance has on the property or cargo that is being insured. It also implies that potential loss or damage of the property or cargo will cause material loss to the insured. When the insured has a questionable interest, the underwriter may insure with the clause 'policy proof of interest, full interest admitted.' The policy can be voided if the contract is not made in *good faith*, that is no parties withholds material facts that might affect the assessments of risks or benefits to other parties. In addition, the injured party might void the contract if there is a breach of any implied or *expressed warranties*. *Implied warranties* arise from the nature of the maritime trade. For ship traveling in the vicinity of the Arctic Ocean in winter, an implied warranty is that she will be properly crewed and equipped to make the trip safely and speedily. If, for example, she deviates from her route, then the underwriter might void the contract. The underwriter can by means of policy clauses, restrict the vessel's activities to, for example, specific ports, trade routes, or time periods.

The risks covered by an insurance policy vary according to the agreement between the two parties. However, there is a standard 'perils clause' that lists the principal risks that are covered [3, p. 97]:

Touching the adventures and perils which {we the assurers are} contented to bear and do take upon us in this voyage, they are of seas, men-of-war, fire, enemies, pirates, rovers, thieves, jettisons, letters of mart and countermart, surprisals, takings at sea, arrests, restraints and detainments of all kings, princes, or people, of what nation, condition or quality soever, barratry of the masters and mariners, and all other perils, losses and misfortunes, that have or shall come to the hurt, detriment or damage of the said goods and merchandises, {and ship, etc.} or any part thereof.

Other clauses that might be present in an insurance contract include the *sue and labor* clause, which entitles the insured to take whatever action is required to save the

property, after a loss has occurred, without losing his insurance coverage. The *direct loss-proximate cause* which holds the insurer liable only if the loss was a direct result of the peril insured against. The *free of capture or seizure* excludes from the policy all coverage for war risks mentioned in the perils clause. The *inchmaree clause* covers the insured for loss caused directly by negligence of the crew, accidents when loading or unloading, explosions aboard, machinery defects, and the like, provided the reasons were not because of 'due negligence' on the part of the owner or the ship. Finally the *collision and running down* clause covers damages to another vessel due to collision or other causes.

In the maritime insurance business it is important to define the types of losses: *partial (averages)* or *total*. *Partial (average)* losses are, in turn, divided into *particular* and *general average*. *Particular average* is the most common reason for claims and occurs when there is a partial loss of property. In order to avoid claims like that, the underwriters add the *free of particular average (FPA)* clause to the agreement, or 'FPA of less than x percent.' In *particular average*, the loss is borne entirely by the particular interest that suffers it. In *general average* the loss is borne by all relevant cargo interests. It happens when there is a sacrifice by one interest for the benefit of all. For example, at a time of distress the cargo of one interest is jettisoned in order to save the ship and the remaining cargo. In this case, the cost of the sacrificed cargo is to be shared by all those who benefited by the action.

A *total loss* might also imply two distinct situations: *actual* and *constructive*. *Actual* loss occurs when the cargo is physically lost or destroyed. A *constructive* loss is when the cargo has been damaged to such extent that the repair is more expensive than its original value. In all cases, when the underwriter pays a claim he takes over the insured's interest in the cargo and his rights to take action against third parties - that is, he has the right of *subrogation*.

Types of marine insurance are the following.

- *Freight insurance* covers the profits the ship-owner expects from a particular trip. The amount of the *freight insurance* is determined from the bills of lading for the trip.

- *Hull insurance* or *hull policies* cover the ship itself from navigational or other hazards. The ship might be covered only while underway or for a specific time, and may be for single ships or whole fleets. *Hull policies* might also apply to ships under construction and while undergoing repairs. When the ship is insured for a voyage, then *voyage policies* take place. They normally contain specific expressed warranties as to the activities of the ship. When the ship is insured for a specific time, *time policies* apply which mostly relate to trade and loading requirements.

Types of warranties are the following:

- *Trade warranties* refer to the type of service of the ship and general trading areas. They are important because they are relevant aspects in the risk assessment and, therefore, they are important for the setting of insurance rates.
- *Loading warranties* regulate quantities of heavy or dangerous cargo.
- *Deviation and Seaworthiness warranties* regulate the ocean passage of a vessel and protect the insured from unexpected damages of his cargo or delays of its delivery.

Marine insurance is also sometimes needed for the cargo and the ship to meet specific requirements such as the contributions to the general average. For the shipowners, this insurance might be obtained from self-insurance schemes entailed in the protection and indemnity (P&I) clubs. P&I clubs offer cooperative self-insurance to the shipowners. Although hull insurance offers some protection against third party liability, the coverage is restricted. In case of injury, loss of life or cargo damage, the shipowner is not protected. For example, if the cargo is damaged during a journey, the owner of the cargo will claim the damage to the underwriter. The latter will then claim against the shipowner in order to recover the loss he paid under the insurance. If the loss is a liability of the shipowner, then he will either have to pay the underwriter or refer the matter to his P&I club which will settle the issue with the underwriter.

I. CONCLUSION

In this chapter we reviewed the shipping industry, which is a very important part of the world's economy. Merchant shipping is a volatile private enterprise and it must be regarded as such by the armed forces when merchant ships are used in naval operations

and expeditionary warfare. Military officers and government agents must be aware of all the aspects of the shipping industry in order to use it in an effective and productive way. Moreover, there is good evidence that both shipowners and the shipping industry as a whole are very keen to do business with government agencies and the military -- as long as the business is fair and profitable.

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III. PARTICIPATION OF MERCHANT SHIPS IN NAVAL OPERATIONS

A. INTRODUCTION

In earlier historical eras, sea-going vessels filled both the roles of ship of war and ship of trade. The sea-trader, the pirate and the warrior were roles interchangeable. In the Iliad, it was merchant vessels that transported the Greeks of King Agamemnon from the mainland to the coast of Asia Minor in order to conquer the rich Greek city of Ilion. During the European voyages of discovery in the 15th and 16th century, ships served both as transports and warships. John Paul Jones, the naval hero of the American Revolution, had been a successful merchant mariner before he became a captain of a revolutionary warship. It was the Hellenic merchant ships and mariners that beat the Ottoman navy in dozens of small and big sea-battles in the eastern Mediterranean and the Aegean Sea from 1821 to 1827 when a small portion of the Greek nation gained its independence.

Merchant shipping had always been an integral part of a nation's sea-power. There has never been an expeditionary naval operation that was planned and executed without the participation of merchant vessels. The dedication, commitment and sacrifice of the merchant mariners and the shipping industry in World War II were legendary.

B. PARTICIPATION OF MERCHANT SHIPS IN WAR

1. Merchant Ships in World War II

Continuous transportation of important cargoes for sustainment of the war effort was vital in Second World War. The allied navies made great efforts to keep the sea-lanes open. The Hellenic Merchant Navy (HMN) was immediately assigned by the Greek government to the allied effort on September 1, 1939. The HMN continued to serve the allied cause around the globe until the end of the war and suffered casualties of 2,500 mariners, 94 percent of the Greek-owned passenger fleet, and 74 percent of the Greek-owned cargo fleet.

In 1939, the dead weight of the HMN was 2.6 percent of the world's capacity, with about 600 ocean going steamships and some 700 smaller merchant vessels. It was bigger, for example, than the combined merchant fleets of Canada, the Soviet Union, Denmark, and Spain.

By September 1941, the British merchant fleet had lost about 25 per cent of its capacity and the Royal Navy had just enough fuel for two months of operations. Thus, any improvement in sea-transportation capabilities were crucial for the allied war effort, and the decision of the Greek government and the Greek shipping industry (shipowners and crews) to assist the British was life-saving.

Two incidents are representative of the courage and valour of the merchant mariners as well as the importance of the logistics support in the theater of operations. The first took place on February 2, 1943 in Libya, when the Hellenic Merchant Ship 'Nikolaos G. Kouloukoundis' unloaded desperately needed fuel for the Eighth British Army. The British Prime Minister Sir Winston Churchill visited the ship two days later and personally expressed his gratitude to the master of the ship Konstantinos Panorgiou. The second incident also took place in Libya, when the Hellenic Merchant Vessel 'Helpis' unloaded fuel for the British under heavy bombardment, and the master of the ship Nikolaos Kouvalias was congratulated by His Majesty King George.

On the other side of the Atlantic, once the United States committed to the Allied cause, a series of programs produced Liberty and Victory merchant ships in massive numbers, and the United States emerged with the biggest state-owned fleet in the world -- both in terms of numbers and tonnage [4, p. 258].

After the war, this big American merchant fleet had to be privatized; the Congress authorized the sale of the ships to both American and non-American investors. According to Reed, "...American investors acquired 847 ships with a total deadweight of 9.5 million tons. Foreign investors obtained 1,113 ships with a total deadweight of 12 million tons." Due to this massive offering of tonnage and with good financing terms, Greek shipowners purchased a great number of American-made merchant vessels, which led to the rebirth of the Greek shipping industry.

2. Merchant Ships in the Korean War

The Korean War was another major geopolitical event that sparked a renewed demand for military sealift. From July 1950 to October 1952, more than 20 million tons of cargo was transported to the Korean peninsula [5, p. 10). The enormous transportation requirements were met by U.S. flag liners (38 percent), the nucleus fleet of the U.S. Navy's Military Sea Transport Service (MSTS)⁴ (12 percent), with the rest being transported by 175 ships broken out from the U.S. Maritime Administration reserve fleet and placed on charter to MSTS [6, p. 110].

During the entire Korean conflict, about 778 vessels were broken out from the reserve fleet and were also used to serve other needs of U.S. national policy, such as the urgent transport of coal to Europe during the winter of 1950-1951 and the urgent transport of grain to India and Pakistan in the spring of 1951. In addition to the conventional merchant vessels that were used during the Korean War, another 35 cargo vessels (the Mariner class) were designed and constructed to serve purely defense assignments. These vessels were viewed uneconomical by the private sector, but 29 out of the 35 were finally sold to individuals and had commercial success [4, p. 259].

After the Korean War, a great number of merchant vessels was brought out of reserve and were bareboat chartered to the operators in order for the U.S. government to regulate the increased tramp shipping freight rates.

3. The Vietnam War

The United States commitment in Vietnam generated a need for a large commercial fleet to sustain the continuous flow of cargoes across the Pacific. Even if the U.S. military was less dependent on ships to carry personnel to the theater of operations, the one-half million U.S. soldiers and the U.S. allies in the area had to be logistically supported. According to Reed, "... over 97 percent of all the material shipped during this eight year period moved by sea." This logistical chain was serviced by liners of the international shipping industry as well as by the U.S. reserve merchant fleet.

⁴ The Military Sea Transport Service was the predecessor of the Military Sealift Command.

4. The Falklands War (Operation Corporate)

The 1982 conflict between the United Kingdom and Argentina in the South Atlantic proved once more that sea power is founded on the effective deployment of both war and merchant ships. The Royal Navy managed in a very short period of time to requisition or charter a large number of merchant vessels for deployment to the war zone. The ships of the Royal Fleet Auxiliary (RFA)⁵ that were manned by RFA officers and civilian crews did their job valiantly suffering heavy casualties⁶. In Appendix B [7] there is a list of the merchant vessels that participated in the Falklands War. The list quite represents the types of merchant ships that would participate in a naval expedition of any volume and complexity. In Operation Corporate, the British merchant navy proved once again its worth to the nation. The following statement of Admiral Sir John Fieldhouse, GCB, Commander-in Chief of the Fleet during the Falklands War, puts the case clearly [8, p. 167]: “I cannot say too often or too clearly how important has been the Merchant Navy’s contribution to our effort. Without the ships taken up from trade, the operation could not have been undertaken, and I hope this message is clearly understood by the British nation.”

5. Desert Shield/Desert Storm

Even if the merchant navy had proven to be a main pillar of power projection, its strategic importance was neglected during the Cold War, when the U.S. focused mainly on military technology and nuclear deterrence. European defense was NATO’s priority and the Greek merchant fleet provided as much as 80 percent of the alliance’s sealift capabilities. With Greece and other European maritime nations like Norway, the alliance has an adequate sealift capability.

However, the U.S. has also been keen to protect its national interests by campaigning in the Middle East and the Persian Gulf. In 1991, in response to Iraq’s

⁵ The Royal Fleet Auxiliary Landing Ships that participated in the conflict were: Sir Galahad, Sir Tristan, Sir Percival, Sir Geraint, Sir Lancelot and Sir Bedivere.

⁶ The Atlantic Conveyor was sunk after a direct hit by an Exocet missile. Sir Galahad was also sunk and Sir Tristan and Sir Lancelot were damaged while attempting a landing of the Welsh Guards at Bluff Cove.

invasion in Kuwait, the United States of America conducted the largest military effort since the Vietnam War. The four-day ground war was preceded and supported by 176 days of heavy logistics effort. According to Reed, “the Military Sealift Command (MSC) shipped 15 million tons of cargo in support of operations, more than 95 percent of the supplies, ammunition and equipment moved into theater. To accomplish the mission MSC had available by January 1991 24 prepositioning force vessels, 8 fast sealift ships (the former SL-7s), 60 Ready Reserve Force vessels, 118 dry cargo ships chartered for the Gulf, 11 U.S. dry cargo ships chartered before Desert Shield/Desert Storm, 7 foreign ships on loan, and 41 chartered tankers.

By the opening of the ground war in January/February 1991, MSC had chartered 21 U.S. flag ships and 162 foreign vessels to supplement 106 ships under its own control. Of these, some 74 were activated from the Ready Reserve Force. The ships utilized ranged from the very newest one to one that was 45 years old.”

One big problem that the U.S. administration faced was lack of civilian crews for the Ready Reserve Force. When the first 42 RRF ships were brought into service, the Marine Administration had according to Reeds to “comb union halls and retirement rolls to round up civilian crews to run them.” Particularly telling was the lack of sufficient numbers of U.S flag Ro-ros. The U.S. authorities had to go to the shipping market to cover the needs for sealift. Even though airlift was used intensively, 95 percent of the logistics support was covered by the sealift.

6. Lebanon Evacuation (2006)

The Israeli-Hezbollah conflict during May and June 2006 in southern Lebanon and the bombardment of Beirut and other major Lebanese cities from the Israel Defense Forces (IDF), created a humanitarian emergency, with thousands of foreign nationals needing evacuation.

The Hellenic Navy rapidly deployed to the area with a Frigate and two amphibious ships — evacuating 5,000 citizens, including Greek, European Union and U.S. nationalities. Ships of the Royal, French and U.S. Navy also arrived and evacuated people from Lebanon to Cyprus. Cyprus became a refugee’s hub; the Cypriot state

accepted an extra 20 percent of its population in a very short time. Cyprus performed extremely well and accommodated all the needs of the displaced people. The refugees were later transferred by air to their respective countries.

However, several other nations chartered merchant vessels in order to evacuate their citizens. France chartered the Greek ferry “Ierapetra,” the United States of America chartered the Greek passenger ship “Orient Queen” and the Saudi vessel “Ramah” [9] Australia, Canada [10] and Sweden also chartered “on spot” merchant vessels in order to evacuate their citizens from Lebanon.

7. Humanitarian Relief Missions

The international community has lately been very active in offering humanitarian relief in areas stricken by natural disasters. The latest incidents include the deadly Tsunami disaster in South East Asia (December 26, 2004) [11] and the Hurricane Katrina disaster in New Orleans (August 28, 2005) [12]. Many governments offered assistance by chartering merchant ships for transporting the refugees (cruise or cargo ships) or for carrying food and medical supplies.

Humanitarian relief operations are complex and require a great deal of organization. Government authorities and the military must cooperate with the shipping industry in order to accomplish the mission at hand. A representative list of the humanitarian relief operations with U.S. government agencies and military participation [4, p. 268] is presented in Appendix C.

C. TYPES OF MERCHANT VESSELS THAT ARE MOST USEFUL IN NAVAL OPERATIONS

The usefulness of merchant vessels in naval operations varies with the type of operations and the capabilities of the Navy that conducts them. Having analyzed the Falklands Operations as well as the sealift U.S. organization, we could conclude to the following:

Tankers

Tankers are indispensable assets and are crucial for the logistical support of any military operation. No modern military force can operate without the continuous flow of fuel. Fuel, maintenance oil and water provision for the combat forces is critical.

Breakbulks

Breakbulks or Multidecks are labor and time intensive vessels to both load and unload. However, they are still in use because of their versatility — carrying heavy equipment, difficult to handle cargoes, and commodities. Their ability to handle odd-shaped or heavy equipment makes them very useful for military applications.

Roll On/Roll Off

The stern and side ramps of the Ro/Ros make them very useful for military sea-lift because vehicles and cargo can simply be driven onboard, secured, and driven off again at the destination. They also require fewer crew-members than a breakbulk because they are not as labor intensive.

Barge carrying vessels (BCVS) or Lighter Aboard Ship (LASH)

These vessel types both, as well as containerships, developed during the 1960s. They load and unload barges (also called lighters) with a crane or an elevator. They never had the commercial success of the containerships, and many of these vessels have been scrapped, sold or converted to containerships. However, these vessels can be very useful for military operations because the barges can handle larger equipment than containers. They also provide flexibility for unloading in an unimproved port, which is usually the case in military or humanitarian relief operations – accomplished by anchoring out and towing the barges to the pier. Their manning level is comparable to a containership or Ro-Ro.

The Sophisticated Multipurpose Cargo Liner

These ships offer the flexibility of cargo diversification. They can carry both containers and small parcels of bulk cargo. In addition, some of these ships have tanks for liquid bulk.

Dry Cargo Ships

The Dry Cargo ships have always been useful, especially for the sustainment of military operation.

Containerships

Containerships are also very useful for the sustainment of military operations and the continuous flow of containerized supplies to the troops.

Specialized Ships

These are ships that are chartered for specialized assignments. This class includes Crane Ships, which are essentially floating cranes that can lift heavy cargo. They are very useful in ports where there is no cargo handling equipment and serve as the unloading gear for other ships. They are relatively labor-intensive vessels, given their small size and comparatively small cargo capacity.

Tugs are always important when it comes to work in a beachhead or in a port. They are indispensable tools for the sealift operations.

Floating Dock Ships are another example of specialized ships that can prove useful in situations like the transfer and repair of the USS Cole.

Fishing trawlers were modified for minesweeping during the war for the Falklands.

Other vessels according to their design characteristics can be converted to forward maintenance stations for helicopters or other military equipment.

Passenger Carrying Ships

In all the major wars and especially in the Falklands conflict, the usefulness of passenger ships was undisputable. All the British expeditionary force was transferred by British-requisitioned passenger ships. In addition, SS Uganda was configured as a hospital ship. In the recent Lebanon evacuation, and in all the humanitarian relief operations, passenger or cruise ships have been chartered by the respective governments.

D. CONCLUSION

It is of vital importance for a maritime nation to preserve a capable merchant fleet in order to be able to project power overseas. Different nations have different plans about how they will negotiate with their respective shipping industries the involvement of merchant ships in naval operations. So far, we have seen various modes of acquiring sealift capability: requisitioning (World War II and Falklands), on-spot chartering (Desert Shield/Desert Storm, Lebanon Evacuation), leasing (some of the U.S. Maritime Prepositioning Ships) and government purchase of merchant vessels (U.S. Maritime Prepositioning Ships). In the following chapters we will further analyze the above methods of contracting.

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IV. METHODS OF CONTRACTING MERCHANT SHIPS FOR MILITARY OPERATIONS

A. INTRODUCTION

In Chapter III, we discussed the extensive use of merchant ships in military operations. Merchant ships have been used as warships in naval operations (e.g., fishing trawlers transformed to minesweepers and containerships transformed to helicopter support ships in Falklands) as well as cargo carriers for strategic sealift (surge and sustainment). Different nations have used different methods for contracting merchant vessels. In addition, a nation might use multiple contracting methods according to the number of merchant vessels that is needed to use and to the purpose that they will be used for. In this chapter, we will analyze the pros and cons of each contracting method.

B. ON-SPOT CHARTERING

On-spot chartering of merchant vessels has been, and still is, widely used by military or other government organizations where there are urgent and unscheduled needs. Humanitarian disasters and civilian evacuation operations usually require the rapid deployment of medical and food supplies. Hurricane Katrina in New Orleans (2005) [12], the tsunami disaster in south-east Asia (2004) [11] and the evacuation of civilians from Lebanon (2006) [9], [10] are recent examples of urgent situations in which the rapid deployment of chartered merchant vessels was critical. On-spot chartering can also be used for the transportation of military equipment as part of a commercial transaction or a donation from one nation to another.

When a military or another government organization, such as the Ministry of Foreign Affairs, decides to use on spot chartering for transportation of cargo or people by sea, then they must follow the shipping market rules. In that case, the shipper or receiver is the military or government organization; and the shipowner is a businessman who would like to profit from the business.

The sea transport need might be for a single voyage. In other cases there might be a need for chartering ships for a longer period. Finally, the military might not want to get involved in the chartering business at all. Then a contract of affreightment might be the best solution.

On-spot charter prices fluctuate according to market trends. As in all markets, the free flow of information regarding the latest developments is vital. High international freight prices will raise the cost of seafight that uses chartered vessels. When freight prices are high, shipowners have a lot of business and they benefit from higher prices. If they do not get a government contract, they will get other profitable contracts. For this reason the government contractors need to be informed of the contemporary freight market and plan ahead. A classic source of information is the daily freight market report published in Lloyd's List. Lloyd's List also includes a dry cargo market report, a tanker market report and other useful information about ships, markets, ports, shipyards, liner and specialist chartering and other useful shipping information. Lloyd's List is like a 'shipping intelligence report.'

There are three common benchmarks for measurement of freight rates [1, p. 92]. Voyage rate for dry cargo commodities is reported in dollars/ton for a standard voyage. This price by convention covers all transportation costs. Time charter rates are commonly reported in dollars per day. Time charter rates apply for 'trip' (i.e., round voyage), six months, twelve months and three years. Finally the third and most complex measure of freight rates is the *Worldscale* -- a system used by the British Government during World War II to compensate tanker shipowners whose ships were requisitioned. *Worldscale* showed the cost of transporting a cargo of oil on all of the main routes using a standard 12,000 dwt tanker. The shipowners were paid the pre-determined rate or a fraction of it. Nowadays, *Worldscale* has evolved, and is used by the tanker industry determine tanker spot freight rates. The *Worldscale* index is published every year after the annual *Worldscale* panel meeting in London that according to Stopford "determines the cost of transportation of a metric tonne of cargo using the standard vessel on a round voyage. The cost is known as *Worldscale 100*." It works as follows. Suppose a tanker is available

in Jubail and the shipowner agrees a rate, say Worldscale 50, to transport the oil to Aspropyrgos. If the Worldscale 100 is \$20 per metric ton, then the shipowner will be paid \$10 per metric ton.

There are advantages and disadvantages for the government when it charters on-spot. When the freight market is 'down' a ship can be 'fixed' at really low prices. In addition, if the agreement is a time charter and the 'fix' is done when freight rates are low, then the government is saving a lot. When the government or military needs are known in advance and good forecasting of the market trends is available, the government officials could save a lot with on spot contracting.

On the other hand the military or other government organizations might be forced to pay high prices when there is a big demand for ships in the market. The shipowners, brokers and operators will negotiate high rates since there is a lot of business everywhere. Usually this is the case when ships must be found on short notice for a civilian evacuation operation or humanitarian assistance.

In order to avoid the volatility of the market, many nations end up with other contracting methods that can guarantee a pool of available merchant vessels any time that they are needed. Leasing, purchasing the option of usage, and requisition are the alternatives.

C. PURCHASING THE OPTION OF FUTURE TRANSPORTATION CAPABILITY

Purchasing the option to use merchant sea transportation capability at times of crisis has a number of advantages. The government is protected from the volatility of the freight rates market; it does not have to maintain and operate a fleet of merchant ships when there is no need for sea-lift; it subsidizes indirectly the national shipping industry; and it has a steady transportation capacity available any time the sealift might be needed. The main disadvantage is cash outflow from the government to the shipping industry⁷. The United States of America has adopted the business model of buying future options of

⁷ Governmental cash-outflow is not a disadvantage when part of government's aim is to subsidize the shipping industry.

contracting merchant vessels in order to maintain a reliable contingency sealift capability, and to assist the domestic shipping industry. That was made possible with the Maritime Security Act (MSA) of 1996, which replaced the existing Operating Differential Subsidy (ODS) program [13, p. 37]. The ODS was a federal program for protection of the U.S. shipping industry by subsidizing the cost differences between U.S. operators and their major competitors on designated trade routes.

According to Kastellot “the MSA authorized a 10-year, \$1 billion program with vessel payments capped at \$2.1 million per vessel per calendar year.” This is a flat fee, which can be used for anything but governmental lobbying. There were forty-seven slots authorized for American flag, American owned and American crewed merchant vessels that would form the so called “Maritime Security Fleet.” The ships had to be less than fifteen years old. Foreign owned vessels could be accepted into the program but had to be less than ten years old; and after they were accepted, they had to be manned by American crews and raise the U.S. flag. In addition, the enrolled vessels could only participate in international trade and not domestic U.S. coastal trade. There were no restrictions on the international routes the participating vessels could trade. However, once enrolled in the Emergency Preparedness Agreement with the DoD, the respective shipping companies had to make their vessels available to the DoD, as well as non-vessel resources such as terminal facilities, intermodal systems, equipment, management and expertise. The participating companies could replace a vessel under U.S. flag with a newer vessel without further government approval; they could own foreign flagged vessels that would not call at American ports without government approval; and they could operate a U.S. flagged liner vessel more than twenty-five years old with the aid of the Construction Differential Subsidy in the coastal trade.

The DoD, and in particular the U.S. Transportation Command (USTRANSCOM), determined the proper mix of merchant vessels prior to taking any applications for the program. USTRANSCOM aimed to create a pool of operators proven to be both reasonable and responsible. In addition, the U.S. maritime assets should enhance both sustainment and surge sealift requirements. According to the Maritime Administration’s “Voluntary Intermodal Sealift Agreement Notice,” the criteria for selecting applicants

were “intermodal system capacity, magnitude of commercial transportation resources, diversity of tracking patterns, commercial viability, operator experience and vessel size, type, and military utility.”

The American shipowners that are accepted to the program and receive the authorized payments are required to enroll in the Emergency Preparedness Agreement (EPA), which obligates them to participate in the Volunteer Intermodal Sealift Agreement (VISA) program. The payment shipping companies receive is restitution for the increased cost of maintaining the ships under both U.S. registry and VISA conditions. The MSP program is deregulatory in nature and does not require the shipowners to operate their ships in particular trade lines or commit particular ships to the agreement. The shipowner has the obligation to find a ship, when a ship is needed, in order to fulfill his obligation. He can either own the vessel or charter it from another shipping company. In this way the USTRANSCOM created a large pool of “certified” shipowners that can assist with transportation of the U.S. Armed Forces.

D. LEASING

The leasing of merchant vessels is a common method of operating merchant vessels. The owner (lessor) buys the merchant ship but has no intend to operate her. She is an investment made to generate cash. In addition, the owner takes advantage of the ship’s depreciation and the possible tax benefits that come from it. Most leases in the shipping industry are capital leases. However, when there are good business opportunities the lease could be an operating one.

The United States of America has leased merchant ships and naval equipment quite often in the past. Over 450 supply ships, using merchant marine crews, were leased and deployed during World War II. During the Korean War, over 200 leased ships were deployed. During the Vietnam War, due to budget limitations, leasing was again the solution for bringing into service nine new T-2 fuel tankers to replace fourteen worn out World War II tankers [14, p. 2].

According to San Miguel, Shank and Summers, the U.S. Navy has a long history of leasing a number of categories of naval equipment, such as power storage batteries on nuclear submarines, reduction gears on surface warfare ships, and medical equipment in Navy hospitals.

However the last “big” leasing project of surface ships for the U.S navy was the TAKX Program which was conceived between 1977 and 1979. The TAKX Program was involved a pre-positioned fleet of thirteen specially designed cargo ships with sufficient Lift-off/Lift-on (LO-LO) and Roll-on/Roll-off (RO-RO) capabilities to support the equipment and supplies necessary for a rapid deployment of three Marine Expeditionary Brigades for thirty days of combat. Three or four ships were required for each Brigade, depending on the transportation capability of each ship.

Leasing is a good method for the military or the government to benefit from the use of a number of vessels or equipment quickly and without committing to a large initial capital expense. When funds are not immediately available, leasing can be a good solution. The lessee avoids freight rate fluctuation and the ships are usually modern and well equipped. Most often, capital leases are used for military equipment, and it covers the bulk of the asset’s life. The assets can be operated as if they were owned by the military or the government, and if certain conditions are fulfilled by the end of the agreement, the ownership of the asset might be transferred to the lessee (military or government organization). The main issues that might rise between the lessor and the lessee in an operating lease are changes in tax legislation, the fulfillment of the lessee’s obligations as far as the cash-flow is concerned, and the decision of the lessee to sell the ship (which would require the complex process of unwinding the lease). The above issues are diminished when the government is the lessee because the government controls the tax legislation and most likely the government or the military has a long-term need for the leased assets.

E. REQUISITION

Finally, requisition is one of the best known methods of contracting merchant vessels by military or government organizations. It was widely used during World War II

when thousands of merchant vessels were requisitioned by most of the participating nations. Most maritime nations still have the legislative authority for requisition to support transportation capabilities in time of emergency or war. A recent example involved the Royal Navy requisitioning a large number of merchant vessels (Appendix B), during the Falklands campaign.

Usually the decision for requisition follows a state of emergency, and needs authorization from the nation's political leadership. Merchant ships that are required to participate in naval operations as well as for surge and sustainment sealift have been preselected by the respective navies, and are requisitioned together with their crews. Those ships belong to the flag registry of the state that requisitions them. The ship-owners are reimbursed at fixed rates the government decides. Usually those rates cover the operational costs of the ships and small marginal profit for the ship-owner. In addition, there are funds appropriated for the shipowners' compensation in case of partial or total loss of the ship. However, some issues and disputes might rise when the ships return to their original owners after the requisition ends. Damages might be claimed by the shipowners, and the state will have to reach to a settlement with them. Such problems rose after the return of the cruise ships Queen Elisabeth II and Canberra from the Falklands campaign. A great deal of the expensive hotel-like furniture, floors and decorations had been destroyed by the Royal Marines and the other embarked soldiers. Even if those damages did not reduce the ships' safety and operability, they were important for their trade, where luxurious decorations and amenities are necessary.

Even if requisition is a contract between the shipper (military or government organization) and the ship-owner, it does not follow normal business transaction procedures. There is no speculation concerned, no supply and demand equilibrium and no volatility of freight rates. The state is in an emergency and compels participation of the shipping industry. Appropriate legislation makes shipowners liable for the consequences if they decide not to comply. However, historical data proves that shipowners have enthusiastically shared the risks when their nations' security and freedom was at stake.

F. A COMPARATIVE ANALYSIS OF ON SPOT CHARTERING, PURCHASING TRANSPORTATION CAPACITY OPTION, LEASING AND REQUISITIONING

The methods of contracting merchant vessels described above have advantages and disadvantages for the military and government organizations. On the supply side, the shipowners are eager to do business with the government as long as it is profitable for them. As we analyzed in Chapter II, the shipping industry is a very volatile business and it is influenced by the international economy. When the freight rates are low, a steady cash inflow is welcome and many shipowners prefer long-term government contracts. When the shipping industry is booming they prefer the high profits that can gain from on spot chartering.

1. On-Spot Chartering

Advantages

- There is no need for a big national flag registry. The nation can contract ships from the international market; however, national security reasons might limit the pool of available vessels to the flag registries that the state feels comfortable with.
- There is no need for maintaining a large national pool of mariners and shipping industry specialists.
- The state can avoid operating and maintenance costs. It can also benefit from its flexibility in selecting the insurance policy.
- The state can select a merchant vessel with special characteristics (e.g., a survey vessel or a floating dock) from the market for a particular period of time and a specific task.
- When market conditions are right, the state can take advantage of low freight rates.

Disadvantages

- It is difficult and often expensive for the state to contract foreign merchant ships for participation in a war zone (e.g., a conflict like the Falklands).
- When freight rates are high, on-spot chartering of merchant vessels is very expensive.
- The respective military or government organization must have a competent staff that follows the market, and is knowledgeable of the

shipping industry and especially shipping contracts. Otherwise, private contract advisors / specialists must be used.

- There is an immediate need for cash outflow that might not have been appropriated. Even if governments can usually borrow money with lower interest rates, unscheduled spending disrupts every government's plans.
- It is, in our opinion, very difficult for a navy that plans a big naval operation to acquire an adequate sealift capability in a short period of time. On-spot chartering cannot service 100 percent the sealift needs of major naval operations that need to be executed in a short period of time and need large sealift capability.

2. Purchasing Transportation Capacity Option

Advantages

- There is no need for a big national flag registry. The nation can contract ships from the international market; however, national security reasons might limit the pool of available vessels to the flag registries that the state feels comfortable with.
- There is no need to maintain a large national pool of mariners and shipping industry specialists.
- The state can avoid operating and maintenance costs. It can also benefit from the insurance policy that it will select.
- The state can select a merchant vessel with special characteristics (e.g., a survey vessel or a floating dock) from the market for a particular period of time and for a specific task.
- There is no dependence on the fluctuation of the freight rates. The volatility of the shipping market is irrelevant.
- When the purchase of the option follows the American model (\$2.1 million per ship per year), it creates leverage in the shipping industry, especially at periods of low freight rates.
- The state is aware of future payments, and can budget and schedule accordingly.
- The state can avoid an initial high capital expense.
- A large and diversified pool of available merchant vessels can be created that could support any naval operation.

Disadvantages

- The state cannot take advantage of low freight rates when the shipping market is down.

- Even if the state never uses the option, there will be a continuous outflow of cash for as long a period as the option was bought.
- When there are no restrictions in the flag registry of the vessels, security issues might rise — especially when the ships have to participate in combat operations.

3. Leasing

Advantages

- The state can select a merchant vessel with special characteristics (e.g., a survey vessel or a floating dock) from the market for a particular period of time and for a specific task.
- There is no exposure to fluctuation of freight rates. The volatility of the shipping market is irrelevant.
- The state is aware of future payments and can budget and schedule accordingly.
- A large and diversified pool of available merchant vessels can be created that could support any naval operation.
- The state is aware of the future payments and can budget and schedule accordingly.
- A large and diversified pool of available merchant vessels can be created that could support any naval operation.
- The state can avoid an initial capital expense.
- Security issues can be controlled, since the state operates the vessel.
- The leasing contract might permit the state to acquire the ships after the leasing period ends (capital lease).
- Disadvantages
- The state cannot take advantage of low freight rates.
- Even if the state never uses the ships in naval operations, there will be a continuous outflow of cash for as long as the lease lasts.
- In order to operate the leased vessels, a large national pool of mariners and shipping industry specialists must exist.
- Capital leases usually require that the state must take care of operating and maintenance costs.

4. Requisition

Advantages

- There is no exposure to fluctuating freight rates. The volatility of the shipping market is irrelevant.
- Cash outflow for the state is limited to the period that the ships are requisitioned. The funds paid for the ships are not negotiable.
- The state does not pay the maintenance costs of the ships.
- After a declaration of Active Service, merchant ships and their crews go under the Naval Discipline Act. This means that the Navy (state) has the power to direct merchant ships' actions and movements very specifically, even if it is against the master's wishes and would put his crew at risk.
- Requisition can only work for national flag shipping. Most maritime states require that a certain percentage of the crew be citizens of the state. This enhances security of operations.
- Requisition laws "protect" the shipowners from being liable to legal action when they break existing contracts in order to bring the ships to Active Service.

Disadvantages

- If the state does not have an adequate national flag shipping registry, requisitioning is not a good solution for acquiring a large number of merchant vessels. Greece, Norway and the U.K are three NATO countries that have a big merchant fleet and requisitioning could work well for them.
- The state must have a large national pool of mariners and shipping industry specialists.
- Specialized vessels might be hard to requisition when they are not in the national flag registry.
- The state pays the operational costs of the ships.

G. CONCLUSION

In this chapter, we did a comparative analysis of four methods of government contracting of merchant ships: on-spot chartering, purchasing an option for future use, leasing, and requisitioning. Several nations use more than one of these methods to maintain an adequate number of merchant vessels available for naval operations. The

choices depends on accurately estimating the requirements of future naval or sealift operations, their effects on the national maritime industry, and the resources the state can commit to maintaining sealift capabilities.

V. U.S. AND HELLENIC POLICIES FOR ACQUISITION OF SEA-LIFT ASSETS. NORTH ATLANTIC TREATY ORGANIZATION (NATO) AND EUROPEAN UNION (EU) SEA-LIFT CAPABILITIES

A. INTRODUCTION

In the previous chapters, we analyzed the shipping industry, shipping risk and the various economic characteristics of the shipping market. Merchant shipping has always been, and will be, a very important part of sea-lift operations. Different states approach contingency contracting of merchant vessels differently. The approaches depend on resources (authorized defense expenditures), and constitutional and legislative limitations, as well as strategy and doctrines.

In this chapter we will analyze the American and Greek approaches to sea-lift. Both countries are democratic⁸ and their economies are based on free trade and capitalism. On the other hand, Greece and the U.S.A. have big differences; their economies and resources are of different magnitudes, and neither their strategic military objectives, nor their national policies are the same. Greece is a commercial maritime power⁹ with a merchant fleet of 2,071 ships and a transportation capacity of 38,695,255 tons dwt as of October 2008 data [18]. The U.S. is the global military power that protects free trade and keeps the sea-lanes open. By analyzing these two countries, we believe that we cover a great range of countries and economies. In addition, we will analyze how big organizations such as NATO and the EU manage their sealift requirements and assets.

⁸ The U.S.A. is a presidential, federal republic and Greece is a presidential parliamentary republic.

⁹ The Greek owned commercial fleet is the biggest in the world, while the Greek flagged commercial fleet is ranked fourth. Greece can offer 80 percent of NATO's sealift and 50 percent of the EU sealift.

B. SEA-LIFT IN GREECE

Greece is a maritime nation and as such, the merchant and war navies (called, respectively, the Hellenic Merchant Navy (HMN) and the Hellenic Navy (HN)) are vital for the physical existence and the economic prosperity of the state.

Due to the archipelagic structure of the Greek state that includes about 2,500 islands and rocks, (inhabited and uninhabited), the Hellenic Navy uses naval ships for sealift operations in both peace and war. These ships are manned by naval crews and are considered men of war. Most of them are armed with small caliber guns for point defense. We could separate them into the following categories:

- Amphibious and Landing ships
- Tankers (for fuel and water)
- Tugs
- Survey ships

These naval vessels have performed well in the past when they were used for sea-lift operations during natural disasters (e.g. earthquakes, forest fires and floods) or humanitarian evacuations (e.g. Albania, Lebanon).

However, in case of a national emergency or war, the Hellenic Navy can requisition any Hellenic merchant vessel that could assist the war effort. The legislation has not changed much since 1937, when the existing requisition law was voted on by the Hellenic parliament in order to prepare the state for the forthcoming World War. According to the existing legislation, navy and coast guard officers are assigned the task of selecting the appropriate merchant vessels that could be used in naval operations.

Since World War II, the Hellenic Navy has not requisitioned merchant vessels. However, due to the similarity of British and Hellenic legislation concerning the requisitioning of merchant vessels, the Falklands conflict is a good example of the procedures and possible missions that requisitioned Hellenic merchant vessels would be called to perform.

During peace time and for missions that the Hellenic Navy does not need to assign warships, merchant vessels are chartered according to normal chartering market

procedures. Merchant vessels can also be chartered by the Hellenic Army or the Hellenic Air Force. So far, merchant ships have not been leased nor have future transportation options been purchased by the Hellenic state.

C. ATHENS MULTINATIONAL SEA-LIFT COORDINATION CENTER (AMSCC)

1. Background

In order to enhance the sea-lift capabilities of NATO, the EU and other friendly nations, Greece established the Athens Multinational Sea-lift Coordination Center (AMSCC) in 2004. The greatest asset of AMSCC is the Greek owned merchant fleet which is currently the biggest in the world. In addition AMSCC can use the merchant ships of other EU maritime countries, such as Malta and Cyprus. AMSCC functions as a shipping broker and is “fixing” ships for the states or organizations (NATO, EU). AMSCC does not receive brokerage fees, since they are covered by the Host Nation (Greece). AMSCC is managed by the Hellenic General Staff, and it is operated by a staff of forty-five officers that come from the countries that participate in it. There are currently twelve member states of the AMSCC: Greece, Italy, Slovenia, Czech Republic, Poland, Romania, Cyprus, Croatia, Hungary, Portugal, Slovakia and Lithuania. In addition, AMSCC is officially cooperates with NATO (SHAPE) and the EU (European Commission).

The mission [19] of AMSCC is to provide:

- Acquisition of sea-lift assets through tender and chartering
- Monitoring of chartered vessels upon user’s request¹⁰

2. AMSCC Procedures for Chartering

States or organizations that have signed a Memorandum of Understanding (MOU) with AMSCC charter ships as follows:

¹⁰ The “monitoring” of merchant vessels is operationally known in NATO as Naval Cooperation and Guidance for Shipping (NCAGS).

- AMSCC receives the sealift requirements.
- AMSCC analyzes the requirements and advises the user on how the requested capabilities could be obtained.
- Once evaluated, the request is passed to the State Maritime Transport Directorate (SMTD) of the Hellenic Mercantile Marine Ministry which will carry out the requested tender and chartering.
- Once the contract is activated the AMSCC will monitor and co-ordinate the chartered asset according to the customers needs or/and requests.
- Tender procedures and all operational activities are provided by the AMSCC at no cost since they are funded by the Host Nation.

A diagram of the procedures followed may be found below [19]:

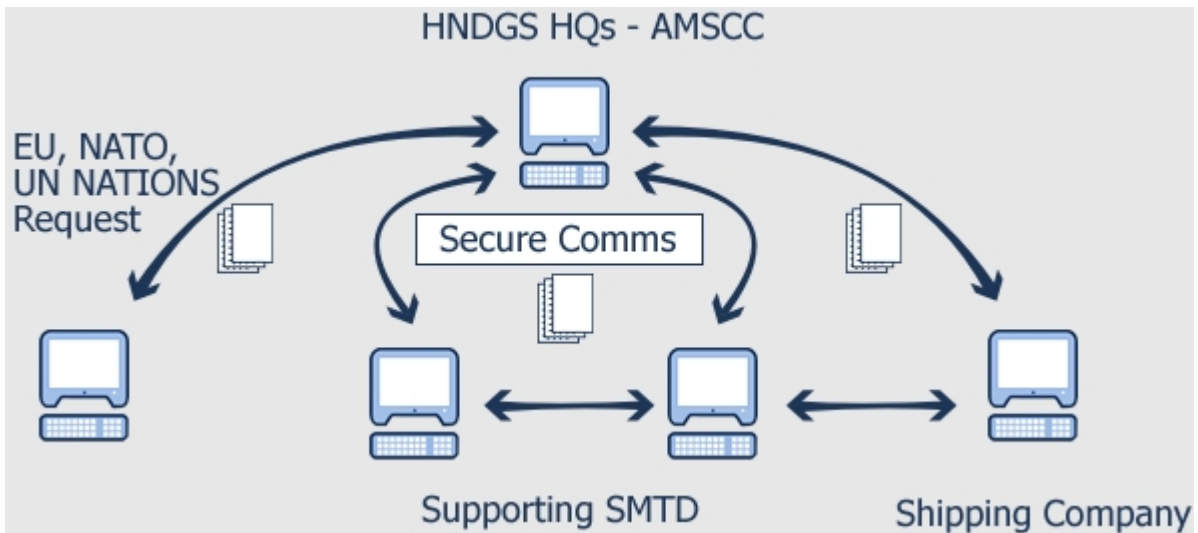


Figure 1. Types of Tenders

- *Open tender:* According to Hellenic legislation, tenders are widely announced to the media and published in the national Gazette at least ten days before the actual tender takes place. This chartering procedure is in line with EU legislation.
- *Limited tender:* This procedure is used for immediate response. Limited publication is applied through the Chamber of Shipping and the Shipping Unions (3-5 days subject to receiving correct terms and conditions).
- *EU tender:* The open tender procedure requires the publication of the declaration of the tender in the Official Journal Publication of the European Community (OJPEC) (at least 52 days).

- *EU Negotiations:* This procedure is also for immediate response. The time limit for the participants' applications cannot be less than 10 days (subject to prior conditions).

The advantages for the states or organizations that participate in AMSCC are the following:

- The states or organizations do not pay any fees for the maintenance or operation of the merchant ships when they do not use them.
- All the operational fees of the AMSCC are provided by the Host Nation (Greece).
- The members are not charged with "brokerage" fees. These are taken care of by the Host Nation (Greece).
- AMSCC can cover the members' sea-lift demands due to its cooperation with the 157 Hellenic shipping companies that have signed a mutual cooperation agreement. In addition sea-lift assets from other EU countries can be used.

D. SEA-LIFT IN THE U.S.A.

1. The U.S. Commercial Shipping

The shipping industry in the U.S.A. has declined over the past century. Even though it has operated in an environment of state protectionism, it has been unable to recover due to high operational costs – attributable to crew, regulations, insurance and taxes.

The first U.S. regulation that contributed to high operating costs was the Lafollette Act of 1915 which required that at least 75 percent of the crew of a U.S. flag vessel be able to speak English. That allowed for a continued disparity in the wages U.S. mariners receive compared to foreign seafarers [20, p. 33].

Because of high operating costs, U.S. shipping firms sought subsidies from the Congress. The U.S. Congress realized the need to support the U.S. maritime industry, both as means to remain competitive, and to maintain a supplemental DoD auxiliary force. According to Waterson, the 1936 Maritime Act initiated several programs and

policies to help defray the rising cost of flying the American flag. One of them is the cabotage, which is still in effect, and prohibits foreign flagged vessels from the U.S. coastal trade. The two main subsidy contracts mandated “(1) various portions of government-generated cargoes being reserved for U.S. flag carriers, and (2) Operating Differential Subsidy (ODS) contracts.” ODS contracts compensated carriers for the cost differentials between U.S. operators and their competitors in certain routes.

ODS and other subsidies have failed to be mutually beneficial for the DoD and the U.S. flag carriers. This is because subsidies were given for those routes where military equipment would be transferred. After the collapse of the Soviet Union, most overseas U.S. military bases overseas closed. That brought a decline in the military cargoes available for transportation. The Maritime Security Act (MSA) of 1996 that was signed by President Clinton established a replacement program for these lost subsidies.

Tax regulations have also hindered the U.S. shipping industry from growing. The Tax Reform Act of 1986 was not beneficial to U.S. shipping firms. It actually repealed tax deferral for shipping income earned outside the U.S. by U.S.-controlled, foreign corporations [20, p. 34]. For most U.S.-controlled foreign corporations, earnings are not subject to U.S. income taxes until the earnings are received as dividends by the U.S. parent corporation. In 1975, tax laws made the earnings of U.S.-controlled foreign shipping companies subject to income taxes in the year in which they were earned; the tax was deferred if the earnings were reinvested in shipping assets [20, p. 34].

The Tax Reform Act of 1986 repealed the deferral. Therefore, the income taxes imposed on U.S. owners of foreign ships led to further competitive disadvantage because any reinvestment into the company must be made in after-tax dollars. The Tax Reform Act of 1986 seemed to be motivated by Congress’ hope of increasing tax revenue for the federal budget. It may have increased revenues, but at a great cost to shipping company reinvestment. Even as the high costs of manning U.S. ships has forced U.S. firms to re-flag their vessels out of the U.S. as a means of more cost effective operations, Congress has effectively found a way, through mandates, to reduce revenues for U.S. ships under foreign flags.

In addition, U.S. shipping companies had to cope with the high maintenance costs under U.S. Coast Guard regulations. On May 4, 1994, testimony presented to the Senate Subcommittee on the Merchant Marine, the leaders of the major U.S. flag companies contended that: “Coast Guard vessel rules increase costs of acquiring new vessels roughly five percent while ongoing cost differentials between Coast Guard requirements and international norms approximate \$100,000 per year per vessel” [20, p. 41].

Worker compensation is another area in which regulations have contributed to the high cost of operating a U.S. merchant ship. Worker compensation laws do not apply to mariners. When accidents occur, they are adjudicated in the admiralty courts before juries. The results of settlements in the U.S. courts have been significantly higher than those under worker compensation. This has led to “greater annual insurance premiums of about \$350,000 for a U.S. flag container vessel rather than approximately \$250,000 for comparable foreign flag ships” [20, p. 40].

Last but not least, U.S. flagged ships have a disadvantage in the cost of repairing overseas. If repairs take place overseas, whether due to catastrophe or scheduling, “at the first U.S. port of call following repairs completed in a foreign shipyard, 50 percent valorem taxes are assessed by U.S. Customs Service on the cost of the repairs” [20, p. 40]. However, U.S. operators continue to use foreign yards, despite the tax, because U.S. shipyards have been about twice as expensive as the foreign yards.

These unfriendly policies for US flag shipping were the main cause for the decline of the U.S. merchant shipping industry during the second half of the twentieth century. In order to cope with the lack of available domestic sea-lift capacity, U.S. logisticians had to create new schemes of co-operation with the shipping industry.

2. The Maritime Preposition Program and the Maritime Prepositioned Ships

The Military Sealift Command Prepositioning Program consists of thirty-two civilian-manned vessels and it is owned and operated by USTRANSCOM’s subordinate command, the Military Sealift Command. Appendix D has a current list of the Prepositioning Ships — as stated at MSC’s website [21]. The Prepositioning Ships are

preloaded with equipment and supplies, and are strategically located in key ocean areas -- to ensure rapid availability during a major war, a humanitarian operation or other contingency. They provide fast response to support initial troop deployments while the rest of the military and sea-lift capacity is being activated. MSC's thirty-two prepositioning ships support the Army, Navy, Air Force, Marine Corps and Defense Logistics Agency. Each ship can discharge cargo either pierside or while anchored offshore using lighterage carried aboard. This capability gives the Marine Corps the ability to operate in both developed and underdeveloped areas of the world.

Prepositioning ships include a combination of U.S. government-owned ships, chartered U.S. flagged ships and ships activated from the Maritime Administration's Ready Reserve Force. All prepositioning ships are crewed by U.S. civilian mariners who work for ship operating companies under contract to the federal government.

While most active ships in MSC's Prepositioning Program strategically place combat gear at sea, there are other ships, including:

- A high-speed vessel that transports Marines, their combat vehicles and their associated gear in and around the Far East;
- A chartered offshore petroleum distribution system ship that can deliver fuel from up to eight miles offshore; and
- Two aviation logistics support ships that are activated as needed from reduced operating status to provide at-sea maintenance for Marine Corps fixed- and rotary-wing aircraft.

The Prepositioning Ships support all the U.S. Forces as follows [21]:

- There are fifteen Maritime Prepositioning Ships that support the U.S. Marine Corps. A current list of the ships is in Appendix E. Fifteen prepositioning ships, called Maritime Prepositioning Ships, are specially configured to strategically position supplies for the U.S. Marine Corps at sea. The ships are laden with a variety of Marine Corps equipment and supplies, including tanks, ammunition, food, hospital equipment, petroleum products and spare parts - ready for rapid delivery ashore when needed. Three ship squadrons contain four to five MPS each, as well as other prepositioning ships that are dedicated to other military services. Each MPS squadron carries sufficient equipment and supplies to sustain more than 15,650 Marine Expeditionary Force personnel for up to thirty days. Beginning in 2000, three Maritime Prepositioning Force (Enhanced) ships were added to the existing MPS squadrons, one ship per squadron, to

provide critical new capabilities for the Marine Corps. Each MPF(E) ship carries a Navy fleet hospital, an expeditionary airfield and engineering equipment.

- There are nine Army Prepositioned Stocks-3 ships that support the U.S. Army. A current list of the ships can be seen at Appendix F. MSC's nine Army Prepositioned Stocks-3 ships strategically place U.S. Army combat equipment at sea to supply and sustain deployed U.S. troops during national crises. Seven of the APS-3 ships are mammoth, government-owned cargo ships, called large, medium-speed, roll-on/roll-off ships, or LMSRs. Each ship has a cargo-carrying capacity of more than 300,000 square feet. LMSRs are ideal for rapid loading and off-loading of Army wheeled and tracked vehicles, as well as other outsized Army equipment. A series of internal and external ramps makes this possible, and huge shipboard cranes allow cargo to be lifted even in the most primitive or war-torn ports. In addition to LMSRs, APS-3 ships include two container ships that store ammunition at sea for the Army. Under the Army Strategic Mobility Program (ASMP), the Army has chosen to expand its afloat prepositioning program to accommodate not only the Mobility Requirements Study (MRS) directed afloat combat brigade, but also common equipment and supplies that facilitate rapid deployment. Included in the afloat prepositioning package are transportation and port opening equipment that are critical to reception, staging, off-loading and onward movement of deploying units.
- There are eight Navy, Defense Logistics Agency and Air Force ships that support not only the previous agencies, but also the U.S. Marine Corps and U.S. Army. A current list of the ships can be seen in Appendix G. NDAF ships provide support for:
 1. The Navy; An activated Ready Reserve Force breakbulk ship prepositions noncontainerized ammunition.
 2. The Air Force; Two long-term chartered container ships preposition munitions.
 3. The Defense Logistics Agency; A chartered offshore petroleum distribution system ship, capable of transferring fuel from ship to shore, keeps deployed U.S. forces supplied with fuel.
 4. The Marine Corps; Two aviation logistics support ships can be activated from the Ready Reserve Force to maintain and repair forward-deployed, rotary-wing aircraft at sea. Two high-speed

vessels support the Third Marine Expeditionary Force mostly for transporting cargo and military personnel between Okinawa, Japan, and other ports in the Far East. A chartered offshore petroleum distribution system ship delivers fuel from offshore to support Marines ashore.

5. The Army; the same OPDS ship that supports Marines ashore also supports Army ground forces.

The Maritime Prepositioning Ships are separated in three squadrons, which are strategically located around the globe in order to respond fast when needed. The locations and the coverage of mission capabilities may be seen in the maps below. MPS Squadron One is located in the Eastern Atlantic Ocean and Mediterranean Sea; MPS Squadron Two is located in Diego Garcia in the Indian Ocean; and MPS Squadron Three is located in the Western Pacific Ocean. The ships that each squadron currently consists of are listed in Appendix H [21].

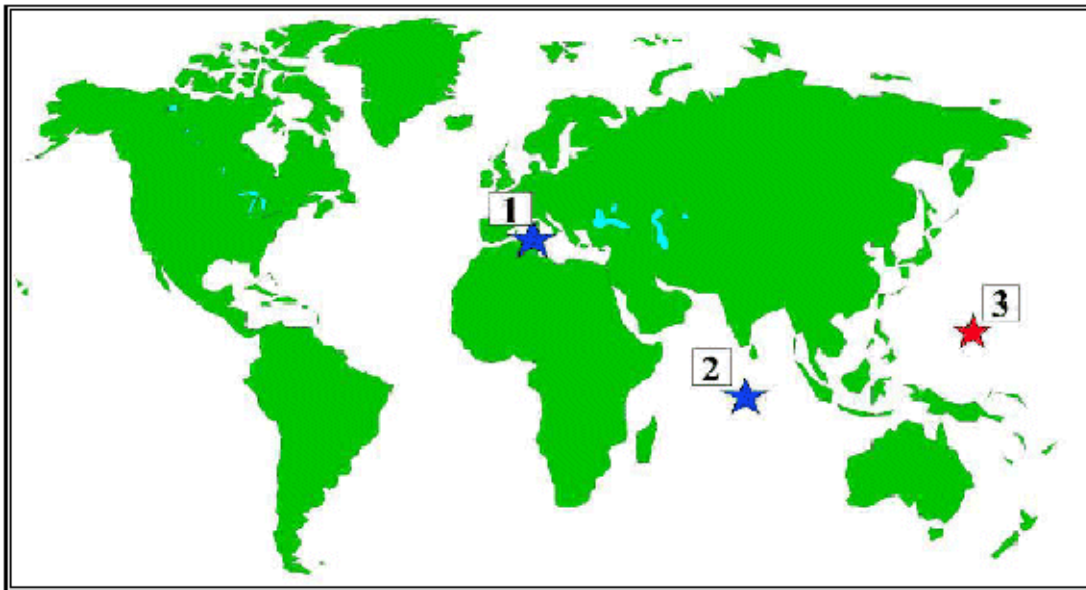


Figure 2. Squadron locations

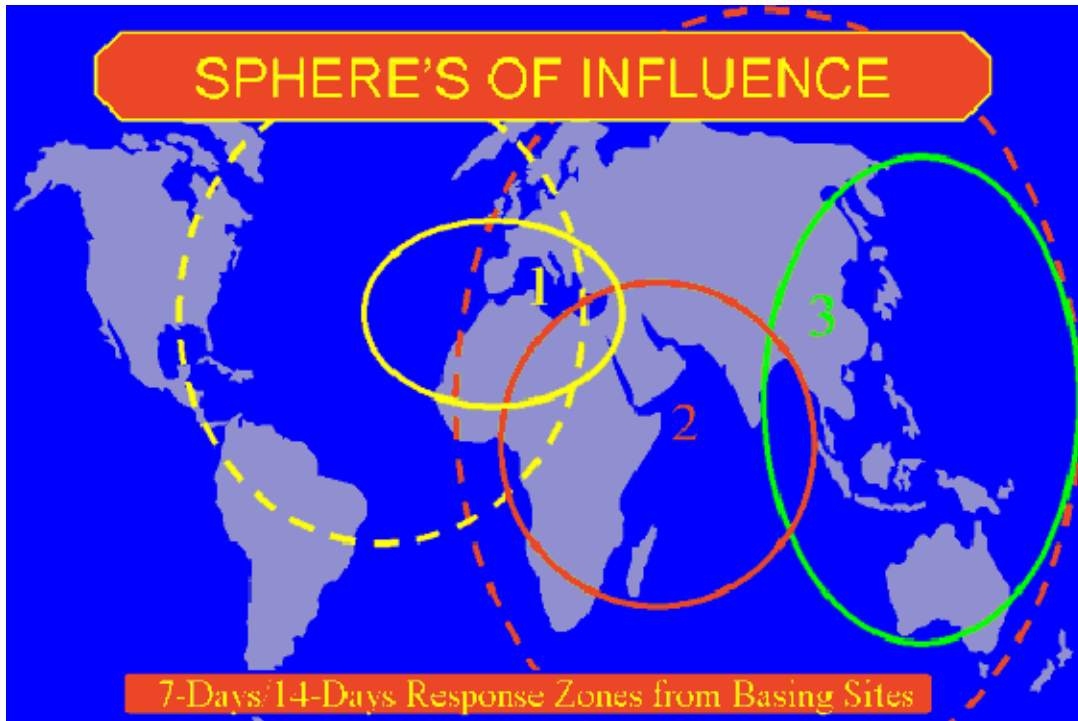


Figure 3. Anchorage and operational radius of MPS [22]

3. Fast Sea-lift Ships

The U.S. Navy owns eight Fast Sea-lift Ships (FSS) (T-AKR), which are normally kept in reduced operating status but can fully activate and be underway to load ports within ninety-six hours. All eight FSS are operated by the U.S. Navy's Military Sealift Command, the sea transportation provider for the Department of Defense. On Oct. 1, 2007, MARAD began operating all eight FSS. The FSS transferred to the Ready Reserve Force (RRF) on Oct. 1, 2008, and lost their United States Naval Ship (USNS) designation [21].

The FSS are among the fastest (speed: 33 knots) cargo ships in the world. They were all built as commercial container ships for Sea-Land Service, Inc., Port Elisabeth, New Jersey. Their high fuel consumption made them unprofitable for commercial operations. However, their high speed makes them useful for the rapid deployment of military forces. Together, these eight ships are capable of moving 93 percent of an Army

Mechanized Division in one voyage [23]. Seven of the eight were responsible for moving approximately 13 percent of all Gulf War I cargo [24]. FSS are roll-on/roll-off and lift-on/lift-off ships, equipped with on board cranes and self-contained ramps that enable the ships to off-load the equipment in anchorages with poor port facilities. The vessels are specially suited to transport heavy and bulky unit equipment, such as tanks, large wheeled vehicles and helicopters. When not activated, the ships are layberthed in the following locations [21]:

- USNS Algol (T-AKR 287) Violet, La.
- USNS Bellatrix (T-AKR 288) Marrero, La.
- USNS Denebola (T-AKR 289) Norfolk, Va.
- USNS Pollux (T-AKR 290) Violet, La.
- USNS Altair (T-AKR 291) Marrero, La.
- USNS Regulus (T-AKR 292) Norfolk, Va.
- USNS Capella (T-AKR 293) Jacksonville, Fla.
- USNS Antares (T-AKR 294) Jacksonville, Fla.

FSS are routinely activated to participate in military operations and exercises or to transport supplies for humanitarian missions as follows:

- In early 2003 all eight FSS were activated to carry U.S. Army and U.S. Marine Corps cargo to the Central Command area of operations in support of Operation Iraqi Freedom.
- In February 1999, USNS Antares was activated to carry U.S. Army cargo in support of the NATO peacekeeping mission Operation Joint Guard to the port of Rijeka in Croatia.
- In October 1998, USNS Algol was activated to carry disaster relief supplies and equipment to Puerto Rico and other nearby islands following the aftermath of Hurricane Georges.
- In 1994, USNS Antares was called into action to transport equipment and supplies to Guantanamo Bay, Cuba, where Haitian and Cuban refugees were provided safe haven by U.S. forces.
- In 1994, USNS Capella and USNS Denebola worked with NATO forces on convoy exercises in the Mediterranean.
- In 1992, during the U.S. humanitarian relief effort in Somalia, six FSS were activated to transport vehicles and equipment to support U.S. forces assigned to Operation Restore Hope/UNOSOM II.

- During the Persian Gulf War, the FSS transported more than 14 percent of the military cargo going to the Persian Gulf.

Each FSS is crewed by forty-two civilian mariners employed by an MSC contractor. Each ship can carry up to twelve U.S. Army personnel, called supercargoes, whose sole duty is to monitor the cargo and ensure it is in operating condition. No active duty Navy personnel are embarked. The FSS are non-combatants, carry no operable weapons systems and are not weapons platforms.

4. National Defense Reserve Fleet (NDRF) and Ready Reserve Force (RRF)

Last but not least, DoD has the RRF at its disposal. During World War II, the U.S. became the largest owner of merchant vessels in the world. The massive construction of “Liberty” ships permitted the allies to keep the sea-lanes open and support the European and Pacific campaigns. After World War II, the Merchant Ship Sales Act of 1946 authorized the activation and maintenance of a government-owned merchant ship reserve fleet. The excess capacity was purchased by the shipping industry and the U.S. government kept the rest (approximately 1,860 ships). Those ships became part of the National Defense Reserve Fleet (NDRF) whose mission was to provide supplemental shipping capacity during a crisis [25].

NDRF vessels supported emergency shipping requirements in seven wars and crises. During the Korean War, 540 vessels were activated to support military forces. A worldwide tonnage shortfall from 1951 to 1953 required over 600 ship activations to lift coal to Northern Europe and grain to India. Another tonnage shortfall following the Suez Canal closing in 1956 caused 223 cargo ship and 29 tanker activations from the NDRF. From 1955 through 1964, another 698 ships were used to store grain for the Department of Agriculture. During the Berlin crisis of 1961, 18 vessels were activated and remained in service until 1970. The Vietnam conflict required the activation of 172 vessels.

From 1945 to 1979, the NDRF shrunk from approximately 1,860 to 318 ships. Additionally the Maritime Administration (MARAD) was formed in 1950 to manage the NDRF during peacetime. The NDRF anchorages were originally located at Stony Point in

New York, Fort Eustis in the James River in Virginia, Wilmington in North Carolina, Mobile in Alabama, Beaumont in Texas, Benicia in Suisun Bay in California, Astoria in Oregon and Olympia in Washington. At its peak in 1950, the NDRF had custody of 2,277 ships.

NDRF vessels are now located at the James River, Beaumont and Suisun Bay anchorages and at designated port facility berths. The program primarily consists of dry cargo ships with some tankers and military auxiliaries. As of November 30, 2008, there were 188 vessels in the NDRF.

In order to meet emergency sea-lift requirements, the U.S. Navy and MARAD agreed in 1976, to select ships from the NDRF that could be activated within five to twenty days. Thus, a Ready Reserve Fleet (RRF) component was established in 1976 as a subset of the NDRF to provide rapid deployment of military equipment. Later, this became known as the Ready Reserve Force which now numbers fifty-one vessels (Appendix E) and includes: thirty-five roll-on/roll off (RO/RO) vessels with eight Fast Sealift Ships, four heavy lift or barge carrying ships, six auxiliary crane-ships, two tankers, two aviation repair vessels and two special mission ships. Two RRF ships are homeported in the NDRF anchorage in Beaumont, Texas. The balance is berthed at various U.S. ports. Layberth facilities are leased from commercial sources and by negotiating for government owned facilities. These outported locations are coordinated with military planners and chosen to minimize sailing time to strategic loadout ports. Outported RRF ships are also used as training platforms for cargo handling by Navy and Army units and for homeland security training by various law enforcement agencies [21].

The RRF is funded by the DoD through the Military Sealift Command (MSC). The DoD also directs and controls operations once the ships have been activated through the U.S. Transportation Command (USTRANSCOM). The Department of Transportation (DoT) was assigned the management and maintenance through MARAD. As a key element of Department of Defense (DOD) strategic sealift, the RRF primarily supports transport of Army and Marine Corps unit equipment, combat support equipment, and

initial resupply during the critical surge period before commercial ships can be marshaled. The RRF provides nearly one-half of the government-owned surge sealift capability.

In addition to maintaining ships for USTRANSCOM logistics, the Missile Defense Agency sponsors two ships for missile tracking. One vessel is currently operational and a second vessel is scheduled to be delivered in FY2010. An additional 20 non-NDRF ships are also held for other Government agencies on a cost-reimbursable basis.

There are twenty-eight vessels in retention status, which are preserved in a way that keeps them in the same condition as when they entered the fleet. Dehumidification of air-tight internal spaces is an effective means of controlling the corrosion of metal and the growth of mold or mildew. A cathode protection system uses an impressed current of DC power that is distributed through anodes to the exterior underwater portions of the hull, resulting in an electric field that suppresses corrosion and preserves exposed surfaces of the hull. Cosmetic appearance work is generally deferred, since it is not detrimental to the ability to activate and operate the vessel.

However, the maintenance of the RRF vessels was not always efficient. In August of 1990, the RRF had ninety-six ships -- of which seventy-eight were activated for the first Persian Gulf War. Only 25 percent met their assigned readiness goal. The reasons for that according to the GAO report [26] were, "... numerous equipment deficiencies caused by improper deactivations when the ships were acquired into the RRF, inconsistent preservation techniques, weak ship manager controls, and the lack of detailed records to track maintenance activities within the fleet."

The above problems were analyzed and solved after the war; by 1999, MSC had expanded the RRF from 92 to 142 ships. Of the 142 ships, 63 would be kept in a high-priority readiness status. Of these sixty-three ships, thirty-six were intended to activate in four days if needed, and twenty-seven would have to be ready in five days. Since then, several RRF ships have been active and participated in naval operations. All ships

activated met their readiness goals. Actually, MARAD's ability to activate ships within 4 or 5 days exceeds the current readiness level of other strategic mobility [26].

Nowadays, commercial U.S. ship managers provide systems maintenance, equipment repairs, logistics support, activation, manning, and operations management by contract. Ships in priority-readiness have Reduced Operating Status (ROS) maintenance crews of about 10 commercial merchant mariners that are supplemented by additional mariners during activations. Readiness of the RRF is periodically tested by DoD-directed activations of ships for military cargo operations and exercises.

The program has experienced a total of 559 vessel activations, with an average of about twenty-seven activations per year since 1990. The RRF made a major contribution to the success of DESERT SHIELD/STORM Operations from 1990 through 1992, when seventy-nine vessels were activated to meet military sealift requirements by carrying 25% of the unit equipment and 45 percent of the ammunition needed. Two RRF tankers, two RO/RO ships and a troop transport ship were needed in Somalia for Operation RESTORE HOPE in 1993 and 1994. During the Haitian crisis in 1994, 15 ships were activated for UPHOLD DEMOCRACY operations. In 1995 and 1996, four RO/RO ships were used to deliver military cargo as part of U.S. and U.K. support to NATO peace-keeping missions. Four ships were activated to provide humanitarian assistance for Central America following Hurricane Mitch in 1998. During the 1990's, RRF ships supported the Afloat Prepositioning Force (APF) with specialized tankers. One dry cargo vessel remains in use and is capable of underway replenishment for the Navy's Combat Logistics Force.

The RRF was called upon to provide humanitarian assistance to the U. S. gulf coast following Hurricanes Katrina and Rita landfalls in 2005 with 866 ship-days of support. The Federal Emergency Management Agency (FEMA) used nine (9) of the Maritime Administration's vessels to support relief efforts; five were in the RRF. Messing and berthing was provided for refinery workers, emergency response teams, and longshoremen, providing about 83,000 berths and 270,000 meals [21].

From 2002 to June of 2008, 118 ship activations were called for in support of Operations ENDURING FREEDOM and IRAQI FREEDOM. In that period, there were 13,575 ship operating days with a reliability rate of 99.0 percent. Almost 25 percent of the initial equipment needed to support the U.S. Armed Forces liberation of Iraq was moved by the RRF. A current list of RRF ships may be found in Appendix I [21].

5. Naval Fleet Auxiliary Force

The forty-one ships of the Military Sealift Command's Naval Fleet Auxiliary Force are the supply lines to U.S. Navy ships at sea. These ships provide virtually everything that Navy ships need, including fuel, food, ordnance, spare parts, mail and other supplies. NFAF ships enable the Navy fleet to remain at sea, on station and combat ready for extended periods of time. NFAF ships also conduct towing, rescue and salvage operations or serve as floating medical facilities. The NFAF ships are government owned and crewed by civil service mariners. Some of the ships also have a small contingent of Navy personnel aboard for operations support, supply coordination and helicopter operations. A current list of the NFAF ships may be viewed in Appendix J [21].

6. The Maritime Security Program

In order to engage the U.S. shipping industry in sea-lift operations, on October 8, 1996, President Clinton signed the Maritime Security Act of 1996 establishing the Maritime Security Program (MSP) for Fiscal Years (FY) 1996 through 2005. On November 24, 2003, the President G. W. Bush signed the National Defense Authorization Act for Fiscal Year 2004, which contained the Maritime Security Act of 2003 (MSA 2003) reauthorizing the MSP for FY 2006 through FY 2015 [21].

The MSA 2003 requires that the Secretary of Transportation, in consultation with the Secretary of Defense, to establish a fleet of active, commercially viable, militarily useful, privately-owned vessels to meet national defense and other security requirements. MSA 2003 authorizes \$156 million annually for FYs 2006, 2007, and 2008; \$174 million annually for FYs 2009, 2010, and 2011; and \$186 million annually for FYs 2012, 2013, 2014 and 2015 to support the operation of sixty U.S.-flagged vessels in the foreign

commerce of the United States [21]. Participating operators receive a flat rate of two to three million dollars per participating ship and they are required to make their ships and commercial transportation resources available upon request by the Secretary of Defense during times of war or national emergency.

The MSP maintains a modern U.S.-flagged fleet providing military access to vessels and vessel capacity, as well as a total global, intermodal transportation network. This network includes not only vessels, but logistics management services, infrastructure, terminal facilities and U.S. citizen merchant mariners to crew the government owned/controlled and commercial fleets.

7. Voluntary Intermodal Sealift Agreement (VISA)

The Voluntary Intermodal Sealift Agreement (VISA) program is a partnership between the U.S. government and the maritime industry to provide the Department of Defense (DoD) with “assured access” to commercial sealift and the intermodal capacity to support the emergency deployment and sustainment of U.S. military forces. Intermodal capacity includes dry cargo ships, equipment, terminal facilities and intermodal management services.

The VISA program is authorized under the Maritime Administration’s authorities under the Defense Production Act of 1950, and the Maritime Security Act of 2003, and was approved as a DoD commercial sealift readiness program on January 30, 1997 [21].

The VISA program provides for a time-phased activation of state-of-the-art commercial intermodal equipment to coincide with DoD requirements while minimizing disruption to U.S. commercial operations. The VISA program can be activated in three stages as determined by DoD with each stage representing a higher level of capacity commitment. In Stage III participants must commit at least 50 percent of their capacity. Dry cargo vessels enrolled in the Maritime Security Program must commit 100 percent during Stage III.

In general, enrollment in the VISA program is conducted annually during an “open season” window. Notification of the “open season” is published in the Federal Register. However, non-VISA operators that re-flag a vessel to U.S. registry can apply for VISA enrollment at any time.

E. SEA-LIFT IN NATO

1. Background

The U.K. and Norway used to maintain half a dozen cargo vessels for national use in case of war or emergency. The maintenance of the respective vessels proved to be expensive and the two nations proposed the creation of a consortium under NATO auspices that would finance the maintenance of the above vessels. The participating countries would share the expenses, with the right to use the transportation capacity of the vessels. This is how the idea of permanent NATO sea-lift assets started. Thus, a High Level Group on Strategic Sealift was established at the NATO Prague Summit in 2002. NATO countries agreed to increase their multinational efforts to reduce the strategic sealift shortfalls for rapidly deployable forces by using a combination of fulltime charter and multinational assured access contracts.

In June 2003, at the annual spring meeting of NATO Defense Ministers in Brussels, eleven Ministers signed a letter of intent to address the sea-lift shortfalls: Canada, the Czech Republic, Denmark, France, Greece, Italy, the Netherlands, Norway, Portugal, Spain and Turkey [27].

Six months later at the 2003 autumn meeting of Defense Ministers, nine countries (Canada, Denmark, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and the United Kingdom) signed an agreement to implement the letter of intent [27].

In order to address the sea-lift shortfalls of NATO, the EU and other friendly nations, Greece established the Athens Multinational Sea-lift Coordination Center (AMSCC) in 2004. A MoU has been signed between NATO (SHAPE) and AMSCC. The function and the participation procedures of AMSCC have been described above. The

main advantages of AMSCC are the “free” participation of the member states and organizations as well as the big pool of vessels that can be used for sea-lift contracts.

Another initiative took place on 12 February 2004, when a consortium, led by Norway, signed a contract with the NATO Maintenance and Supply Agency (NAMSA) for the provision of the sealift capability [27].

2. The Sea-lift Consortium

Several NATO nations pooled their resources to charter special ships, giving the Alliance the capability to rapidly transport forces and equipment by sea. The consortium finances the charter of up to ten special 'roll-on/roll-off' ships. The ships are financed even if they are not used. In this way, the U.K., Norway and Denmark keep their sea-lift vessels active with money from the consortium; and the countries who are members of the consortium can use the ships when they need them. The consortium is led by Norway and includes Canada, Denmark, Hungary, Italy, the Netherlands, Portugal, Spain and the United Kingdom [27].

As of 2004, the consortium is provides the Alliance with access to [27]:

- three roll-on/roll-off (Ro/Ro) ships on assured access;
- one to two Danish Ro/Ro ships on fulltime charter;
- residual capacity of four United Kingdom Ro/Ro ships;
- and a Norwegian Ro/Ro ship on an ad hoc basis.

The three assured access ships are covered by a ‘dormant’ contract with the NATO Maintenance and Supply Organization in Luxembourg. Financing is provided by seven of the nine signatories (all but Denmark and the United Kingdom) [27].

Denmark provides the Tor Anglia and the Tor Futura Ro-Ro vessels, which are chartered on a fulltime contract for several years. The United Kingdom offers the residual capacity of four of the six Ro-Ro vessels provided to its Ministry of Defense under a 25-

year Private Finance Initiative contract with AWSR Shipping Ltd. lasting until December 2024. In addition, Norway has a 'dormant' contract for one ship.

For example, the Danish and UK ships can each carry around 2,500 lane meters of vehicles and equipment, which would stretch two and a half kilometers if they were in a single file.

3. The Sealift Coordination Center

Sealift capacity is coordinated by the Sealift Coordination Centre (SCC) established in September 2002, also at the Royal Netherlands Air Force base in Eindhoven. During its two years in operation the SCC has already proven its effectiveness. Through better coordination, the SCC has managed to establish many matches between different nations. By making more efficient use of the available assets, these nations have realized significant financial savings. Currently, Belgium, Denmark, Germany, the Netherlands, Norway and the United Kingdom are members of the SCC [27].

4. The Movement Coordination Center Europe

Several European Union and NATO countries took a further step towards better coordination of their strategic air and sea transport by establishing a Movement Coordination Centre Europe at Eindhoven Airbase, the Netherlands, on 1 July 2008 [27].

The new Centre (MCCE) will coordinate strategic transport assets and air-to-air refueling activities between the participating countries, aiming at a more efficient and effective use of the various national assets. In addition, the Centre will coordinate movement support to EU and NATO during deployment and re-deployment operations. Strategic lift involves transporting troops, equipment and supplies across the globe by air or sea.

The MCCE is a merger of the European Airlift Centre (EAC) and the Sealift Coordination Centre (SCC). The EAC and SCC were set up as a result of NATO's

Defence Capability Initiative agreed in 1999. The operations of these two centres have proven to be very successful and participating nations have saved millions of euros by coordinating their lift requirements and avoiding empty legs or space on their transport assets. The founding MCCE countries are: Belgium, Canada, Denmark, France, Germany, Hungary, Italy, Latvia, The Netherlands, Norway, Slovenia, Spain, Sweden, Turkey and United Kingdom [27].

F. SEA-LIFT IN EUROPEAN UNION (EU)

1. Background

The European Military Capability Commitment Conference took place in Brussels, November 22, 2004 and included decisions that were milestones towards common European defense cooperation. During this conference, the EU entered a new stage in strengthening military capabilities for crisis management, launching initiatives such as on the Headline Goal 2010, the EU Battlegroups, the civil-military cell and establishing the European Defense Agency (EDA).

2. Rapid Response – EU Battlegroups

The ability for the EU to deploy force packages at high readiness as a response to a crisis is a key element of the 2010 Headline Goal. The Battlegroup is a specific form of rapid response and is defined as the minimum militarily effective, credible, rapidly deployable, coherent force package capable of stand-alone operations, or for the initial phase of larger operations. The Battlegroup is based on a combined arms, battalion sized force and reinforced with Combat Support and Combat Service Support elements. Battlegroups can be formed by Framework Nations or by a multinational coalition of Member States. Interoperability and military effectiveness are key criteria. Battlegroups must be associated with Force Headquarters and pre-identified operational and strategic enablers, such as strategic lift and logistics.

3. Sea-lift and Global Approach on Deployability

Strategic mobility is crucial for EU Battlegroups. European Capability Action Plan (ECAP) Project Groups on strategic transport addressed the recognized shortfalls and provided solutions for both sea-lifts and air-lifts. In addition, the Global Approach on Deployability (GAD) formed another important contribution to improved strategic transport by primarily focusing on more effective use of all available means for transport co-ordination. GAD envisages the co-ordination of all strategic lift assets, mechanisms and initiatives in support of EU-led operations, and in particular, the EU Battlegroups [28, p.8].

The co-operation between the existing mobility centres enhances strategic transport options and leads to a better use of existing transport assets. Currently there are the following European multinational and national sea-lift co-ordination cells/centres [25, p.20]:

- The Athens Multinational Sea-lift Co-ordination Centre (AMSCC) which has declared its services and available assets to the EU. AMSCC is a national centre and is capable of “co-ordination, chartering and monitoring” sea-lift capability.
- The MCCE which has been described above and is a merger of the European Airlift Centre (EAC) and the Sealift Coordination Centre (SCC).
- As far as the funding is concerned, the European Committee is the responsible authority for the appropriation of funds for European sea-lift operations.

G. CONCLUSIONS

Sea-lift is of great importance for states or organizations that project power overseas. Starting from a global power like the U.S.A, the sea-lift assets and the sea-lift organization is large and of great diversity. Smaller maritime nations, like Greece, maintain a capable sea-lift force whose maintenance costs less and can be acquired through requisition. Finally, multinational organizations like the EU and NATO use multinational centers such as the AMSCC and the MCCE in order to have access to sea-lift assets.

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VI. DETAILED ANALYSIS OF FUTURE TRANSPORTATION CAPACITY OPTIONS

A. INTRODUCTION

In the previous chapter, we saw that purchasing the option of future transportation capacity is a method with advantages and disadvantages. Even if options in the stock market are common, and much research has been done for their evaluation,¹¹ research on options of freight rates in the shipping industry is still in its infancy. The U.S. Transportation Command, however, has come to an agreement with the U.S. shipping industry, and has purchased the option of future use of transportation capability. This is because National Security is important, and the state is not speculating for future profit in the way that the private sector does. In the following paragraphs, we will investigate this agreement will analyze options theory as it might be applied in the freight rates of the commercial world.

B. THE MARITIME SECURITY PROGRAM

As we saw in Chapter IV, the Maritime Security Act (MSA) of 1996 permitted to the United States of America to buy future options of contracting merchant vessels in order to maintain a continuous sealift capability and to assist the U.S. shipping industry during various contingencies.

The American shipowners that are accepted to the program and receive the authorized payments are required to enroll in the Emergency Preparedness Agreement (EPA) which obligates them to participate in the Volunteer Intermodal Sealift Agreement (VISA) program. The payment that the shipping companies receive is restitution for the increased cost of maintaining the ships under both the U.S. registry and VISA conditions. Even if the MSP is costly, it is about half as expensive as the Operating Differential Subsidy (ODS), which expired in 1997. ODS subsidized U.S. operators for keeping assets

¹¹ The most famous formula for evaluation of options is the so-called Black-Scholes formula for the prices of calls and puts.

useful to U.S. contingency plans, providing annually about \$4 million per vessel to 53 vessels. The cost exceeded \$200 million annually [Ref.14, p. 12). If the DoD attempted to replicate the sealift capability with organic assets some experts argue that it would cost up to \$800 million annually [16].

C. THE VOLUNTEER INTERMODAL SEALIFT AGREEMENT

The Voluntary Intermodal Sealift Agreement (VISA) was approved on January 30, 1997, by Defense Secretary William S. Cohen. It followed the Maritime Security Act (MSA) of 1996 and it was a parallel initiative with the congressionally approved Maritime Security Program (MSP). VISA represents the effort of the DoD to integrate civilian transportation capabilities in U.S. sealift capabilities in manner that is more cost-effective and friendlier to the shipping industry. It is similar to the other DoD program that has integrated civilian aircraft into the Defense Transportation System (DTS). This program is called the Civil Reserve Air Fleet (CRAF).

While the MSA requires that the ships participating in the Maritime Security Fleet must be U.S. flagged of fifteen years or less, owned and operated by U.S. citizens, and crewed by U.S. citizens,¹² participating firms in VISA are not required to provide U.S.-flag ships. VISA is a program based on capacity, not particular ships. So, the participating companies must only provide ships that meet the required from the DoD enrollment capacity. The idea is to allow U.S.-flagged ships to continue their regular routes so the company does not suffer financially. VISA and MSP are mutually dependent, and are linked by MSP's requirement that its participants have to enter the Emergency Preparedness Agreement with DoD.

Apart from directly subsidizing shipping companies with \$2.1 million per participating ship, VISA is designed to create close working relationships among the Maritime Administration (MARAD), the USTRANSCOM and industry participants -- through which contingency needs and the needs of the civil economy can be met. During contingencies, participants are afforded maximum flexibility to adjust commercial

¹² Vessels under ten years of age, operating under a foreign flag, can also apply for an agreement, but if accepted into the program, must be operated under the U.S. flag with U.S. crews.

operations by Carrier Coordination Agreements (CCA), as stated by applicable law. A CCA is an agreement between shipowners/operators that helps meet the needs of the DoD while minimizing the disruption of the business industry. So, if a shipowner is committed to the program and the DoD asks for transportation capacity, which he does not have available, he can use CCA and offer another ship that is available.

While MSP is more of a “practical” program authorized by the U.S. Congress to subsidize U.S. Merchant ships for participation in naval and sealift operations, VISA could be described as a means of engaging the U.S. shipping industry in the decision making process.

D. OPTIONS

In the shipping market, business decisions are taken according to the future profit prospects. The DoD values the sealift capability more than the prospect of profit. No sealift capability would be disastrous. Moreover, purchase of options is a common business practice in the civilian world.

When we purchase an option, we have the right, but not the obligation, to buy or sell an asset at a fixed price on or before a given date. The option holder will use his option only if he can profit from it. Otherwise, the option can simply be thrown away. We should not mistake the options with forward contracts and futures, where the delivery of the underlying asset is expected to take place irrespective of whether one of the parties is losing [17, p. 558].

In the stock market, a buyer of a European call option for a particular share at an exercise price of, say \$10 will on the expiration day exercise his option only if the share at that time is worth more than \$10. Otherwise he will not use the option.

Some important terms in the options transactions are the following.

- *Exercising the option:* It is the act of buying or selling the underlying asset via the option contract.
- *Striking (or exercise) Price:* It is the fixed price in the option contract at which the holder can buy or sell the asset.

- *Expiration date:* The maturity date of the option. After this date the option is dead.
- *American vs. European option:* The American option can be exercised anytime up to the expiration date; the European option can be exercised only at the expiration date.
- *Call option:* The right to buy an asset at a fixed price at a specified time.
- *Put option:* The right to sell an asset at a fixed price at a specified time.

The following real options as opposed to traded options are quite common in shipping [17, p. 559]:

- Consecutive voyages for spot contracts.
- Time charter options.
- Time charters with purchase option for the vessel.
- New building options.

In addition to the above, strategies for lay-up, prolongation of the vessel's life or even scrapping can usefully be studied by thinking in terms of options.

The main question in options theory is the following: how much more (option premium) can be paid over and above the spot rate at the present time for purchasing the future option. In the case of freight rates, the problem is translated to how much over and above the current rate a shipper will pay in order to have the option to ship goods in the future (e.g., next month) at a predetermined rate. In order to understand how that works, we will analyze the following problem.

Let us assume that a charterer has chartered a vessel for \$10,000 a day for a week (7 days). This is the price agreed on with the shipowner. However, the current freight rate per day for a two-week charter is \$9,700. The charter rates next week are unknown and we can only speculate. How much should the shipper pay above the current rate (option premium) in order to get the same transportation capacity next week? The shipper should make the following analysis:

Option 1

If he charters the ship for one week, he will pay \$10,000 per day.

Option 2

If he charters the ship today for two weeks, he will pay \$9,700 per day. He does not know what the freight rates will be next week. There are two possibilities. They can be higher, let us assume 12,000 per day, or lower, and let us assume \$7,400 per day. If he relets the transportation capacity to another shipper: if freight rates go up next week he will make \$12,000-\$9,700=\$2,300 per day in the second week, and \$300 per day in the first week. If freight rates go down he will make \$300 per day in the first week and he will lose \$9,700-\$7,400=\$2,300 per day in the second week. From the above analysis we conclude that the shipper would be eager to pay no more than a \$2,000 premium for the option of future transportation capacity.

A big scientific breakthrough for the evaluation of options was the so-called Black-Scholes formula for the prices of European calls and puts. The formula for a European call is:

$$C = S * N(d_1) - X * e^{-rT} * N(d_2), \text{ where}$$

$$d_1 = \frac{\ln(S/X) + (r + s^2/2) * T}{(s * T^{0.5})}$$

$$d_2 = d_1 - s * T^{0.5}$$

where,

S = The stock price

X = The exercise price

r = The risk-free interest rate

T = The time to expiration

S = The standard deviation (volatility) of the stock price and N(z) is the cumulative probability function for a standardized normal variable.

The Black-Scholes formula is based on the assumption that stock values follow a log-normal diffusion process (Geometric Brownian motion). We could argue that this is

not the case with freight rates. Freight rates move in cycles, and when freight rates are high there is a higher probability that they will be lower in the next period rather than higher. The prediction of the future freight rates is a field for future research and it will give to the shipping industry useful tools for handling shipping risk.

E. CONCLUSION

Purchasing the option of future transportation capacity can be of great use for states or organizations (e.g., NATO, EU) that need an expeditionary capability. The American model, as it was described above is of great value and importance because it accommodates both future sea-lift capability as well as the involvement of the U.S. shipping industry in the decision making process.

The criteria for making decisions about options and futures are different in the business world compared to those that a government will consider. Speculation and handling risk are always a significant consideration. On the other hand, a state values capability and the national security more than financial outcomes.

VII. DETAILED ANALYSIS OF LEASING MERCHANT SHIPS

A. INTRODUCTION

In Chapters II and IV, we introduced leasing as a method of financing merchant ships in the shipping industry, as well as a method for governments or international organizations to contract merchant ships intended for long-term use.

There are two common types of lease that are in use. The *operating lease* and the *capital* or *finance lease*. The *operating lease* involves a short term usage of the equipment by the lessee. Maintenance is carried out by the lessor, and at the end of the lease the equipment goes back to the owner (lessor). In an *operating lease*, the lessor bears most of the business risk.

The *capital* or *finance lease* is longer and usually covers the bulk of the asset's life. The lessor is mainly a financier, and is not involved in the operation or maintenance of the asset. In the event of a sudden termination of the agreement, the lessee usually must compensate the lessor. In addition, if certain conditions are fulfilled, ownership can be transferred to the lessee.

B. LEASING IN THE SHIPPING INDUSTRY

In shipping, most of the leases are *capital* because they often bring tax benefits to the lessors. The lessor usually purchases the ship, for which he gets a loan from a commercial bank. The loan might cover as much as 80 or 90 percent of the ship's value. Often governments assist the national shipbuilding industry by offering incentives to the lessors, such as accelerated depreciation. Lessors are usually for-profit companies that look for a good investment that can also offer tax relief. They usually lease the ship to a shipper who operates the ship as if she were his own. According to the agreement, the lessor receives regular payments from the lessee.

In the leasing transactions there are three main risks to consider [1, p. 217]: (1) the revenue risk (will in the end the lessor be compensated in full for the asset that he has

purchased?), (2) the operating risk (who will pay if she breaks down?), (3) the residual value risk (who gets the benefit if she goes up in value?). Because of the reasons above, the paperwork for lease transactions is complicated and leasing works best when there is a well defined long-term requirement for the ship and a well-established shipping corporation. Government organizations and the military are financially stable organizations and lessors are usually willing to proceed to a leasing transaction with them.

1. The U.S. Navy Acquisition Program via Leasing

The U.S. Navy considered leasing as a solution for replacing the “Prepositioned Force of Merchant Ships” that was deployed in the late 1970s at Diego Garcia in the Indian Ocean and was made up of older cargo vessels. The so-called TAKX Program was officially authorized by the Naval Sea Systems Command (NAVSEA) in 1979 [14, p. 3] and it proposed a pre-positioned fleet of thirteen specially designed cargo ships with sufficient Lift-off/Lift-on (LO-LO) and Roll-on/Roll-off (RO-RO) capabilities to support the equipment and supplies necessary for the rapid deployment of three Marine Expeditionary Brigades for thirty days of combat. Three or four ships were required for each Brigade, depending on the transportation capability of each ship.

Unfortunately, funding for non-combat support ships was not seen as possible in the early 1980s. In this context, leasing was the only solution in order to keep the MPS program alive. In this respect, NAVSEA issued a Request for Proposal (RFP) in October 1981 — which sought bids to supply thirteen ships for the MPS program.

Leasing can be a very complex financing activity. The lessor that does not operate the ship, must be satisfied that the lessee will meet his obligations under the lease. This is why only financial sound shipping companies are likely to qualify. Of course in this particular case, the lessor should have no fears that the DoD would default on the payments. However, a future non-supportive decision of the congress might occur. In addition, the lessor is tied to a long-term transaction. If he decides to sell the ship, he must go through the complex process of unwinding the lease. Another problem is that since tax laws may change, the tax benefit is never quite certain, and this must be covered

in the documentation. For the above reasons, the Navy issued a RFP for consulting services. Argent Group, Ltd. (AGL), a small investment banking firm specializing in leveraged-lease financing, was engaged.

The structure of the deal according to San Miguel, Summers and Shank, was as follows:

- *Operator (lessee):* The Maritime Sealift Command (MSC). The U.S. Navy retained the right to inspect the construction of the ships. It also did not have any liability to the shipyard in the event of cost overruns.
- *Contractor:* There were three contractors: General Dynamics Corp., Maersk Line Ltd. and the Waterman Steamship Corp. The contractors were the “brokers” of the deal. They negotiated a fixed-price construction contract with the shipyards and provided progress payments during the construction. They also arranged interim loans to finance the construction, and assumed all the risk associated with the loans until an acceptable ship was delivered to the Navy. Finally, the contractors were responsible for supervision of the construction according to the Navy’s operational and technical requirements. Since the MSC had an expertise in merchant ships they were ideal for doing this job. The contractor then paid a supervisory fee to MSC to supervise the construction.
- *The lessors:* The investor (lessor) was the Federal Financing Bank (FFB) which acquired 70 percent of the ships. This 70 percent was in the form of debt for twenty-five year bonds purchased by the FFB. Other investors that financed the ships with equity were the Salomon Brothers Inc (30 percent of five ships) in cooperation with the General Dynamics Corp.; the Morgan Guaranty Trust Co. of NY (30 percent of five ships) in cooperation with Maersk Line Ltd.; and finally Citibank, N.A. acting jointly with Manufacturers Hanover Leasing Corporation (30 percent of three ships), in cooperation with Waterman Steamship Corp. The lessors / investors assumed ownership upon delivery of the ships. Under the existing legislation they were eligible to receive accelerated depreciation tax benefits associated with the ownership.
- *Shipyards:* The shipyards used were the following: the shipyards of General Dynamics Corp. used by the same contractor (five ships); Bethlehem Steel Corp. used by Maersk Line Ltd.; and National Steel and Shipbuilding Co. used by Waterman Steamship Corp.

After construction, the ships were delivered to the owner, who simultaneously delivered them to the contractor under a “bareboat charter.” The contractor then turned the ships over to the MSC under a time charter operating contract. The time charter was structured as follows [14, p. 9):

- The U.S. Navy began its charter hire payments (comprising both the capital hire and operating hire payments) upon delivery and acceptance of each ship.
- Upon delivery, the capital hire rates were adjusted to reflect the actual debt and equity financing rates. Once adjusted, the Navy's capital hire rates were fixed for the entire charter period.
- Each Time Charter was an initial five-year contract with four renewal periods, for a total of twenty-five years. If the U.S. Navy failed to exercise renewal options or terminated for convenience after the initial period, the vessel would be sold, and the Navy would pay the difference between the selling price and the contractual termination value which was designed to repay the debt and give the owners their agreed-upon return on investment. However, the Navy held an option to purchase the ships at the higher of the termination fee or ship's market value.
- The operating hire component was paid to the contractor, who in turn paid the MSC. It included operating expenses and a margin as was agreed in the contract. The contractor also assumed the risk for all off-hire provisions and ship non-performance. The time charter also contained inflation provisions to compensate for increases in crew wages, stores and subsistence, maintenance, and insurance. Provision for loss of the ship was also included.

The above leasing agreement was a success story for the U.S. Navy. The acquisition process was reduced from five to seven years to two years. This is because the whole process was managed cost-effectively according to the shipping market rules. The shipyards could not delay the construction because they would be fined and all the plans were reviewed with less bureaucracy involved. In addition to the above, the use of commercial shipbuilding standards reduced the cost of each ship by \$35 million (\$182 million versus \$217 million).

2. The Advantages of Leasing

Except for the advantages and disadvantages that we analyzed in chapter V, the experience of the U.S Navy gives useful insights on leasing as a method of contracting. We could analyze them as follows:

- Due to decreases in defense spending, a critical defense project might be delayed or even canceled. In this case, capital leasing allows the government to receive and use assets immediately and spread the cash outlays over the lease period rather than paying 100 percent of the cost up

front. Leasing can become a powerful tool for a government and provide financial alternatives that normally would not be available.

- The U.S. Navy as well as most military organizations produces a requirements document that spells out, in great detail, the operating characteristics and military specifications for any piece of equipment. For particular ships the authorizing policy would dictate military specifications as a standard. The Maritime Prepositioned Ships were not designed to participate in combat operations. Thus, construction according to military specifications would delay the project and make it more expensive. By constructing the vessels according to the American Bureau of Shipping (ABS) regulations and commercial standards, cost savings of \$35 million per ship were passed on to the government. In addition, each shipyard was under tight constraint, and delays or design changes were not allowed. The norm is that severe penalties are imposed on the shipyards for late deliveries of ships. In this particular case the ships were in use within about twenty-four months.
- It is often the case that national emergencies require the immediate acquisition of assets. The normal procurement procedures might take a lot of time. A leasing contract can be a very good solution that will give an opportunity to the government to schedule future payments and acquire the asset in a relatively short time.
- Finally, “commercial off-the-shelf” (COTS) assets such as computers, medical equipment, standard industrial components, or general-purpose supply equipment have already been built and tested. In those cases the lengthy procurement processes do not add any value.

C. CONCLUSION

In this chapter we saw that leasing is a widely used method of contracting in the shipping industry. Investors that do not specialize in the shipping business buy or build ships and then lease them as “bareboat charters” to operators. The operators are shipping experts and pay their lessors the agreed lease payments.

In addition leasing can be used by government organizations. One good example has been the U.S. Navy which successfully leased the Maritime Prepositioned Ships in the early 1980s. This above-described project could be successfully repeated under the appropriate circumstances by other Navies and governments or organizations.

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VIII. SUMMARY CONCLUSIONS AND RECOMMENDATIONS

Assessing the different options for contingency contracting merchant ships (spot market price, lease, option, requisition) for naval and sealift operations is a problem whose solution depends on several independent variables. Those are the short and long-term performance of the international shipping market; the competence of the national shipping industry; national security concerns; maritime strategy; foreign policy; maritime and acquisition legislation; and finally the economic strength of the respective nation or organization.

The shipping market as a whole is very competitive, with high risks. Ships' demand determines the on spot market price of freight rates. Since shipping is a service business, ship demand depends on several factors including price, speed, reliability and security. The shipping business includes the risk that the investment in a merchant ship, including a return on the capital employed, is not recovered during the period of ownership. Shipping risk can be shared by the shipper and the shipowner.

The four shipping markets are: 1) freight, 2) sale and purchase, 3) new construction, and 4) salvage. Those markets are related, and they all affect the supply and demand for merchant ships.

The *freight market* consists of shipowners, charterers and brokers. There are four types of shipping contracts: 1) voyage charter, 2) contract of affreightment, 3) time charter, and 4) bareboat charter. The shipowners trading in the voyage market enter into contracts to carry cargo for an agreed price per ton while the charter market involves hiring out the ships on a daily basis (time charter).

Second-hand ships are traded in the *sale and purchase market*. The buyers and sellers are shipowners. Ship prices are volatile and this makes trading ships an important source of revenue for shipowners. The second-hand value of merchant ships depends on the freight rates, age, inflation and expectations.

In the *new building market* the participants are shipowners and shipbuilders. Prices are just as volatile as second-hand prices and they usually follow the same pattern.

Finally, in the *demolition market*, old and obsolete ships are sold for scrap.

Supply and demand are the two components of the economic model of the shipping market. Supply and demand are coordinated by price signals, including freight rates, which bring supply and demand into balance.

The choice between new ships and old, flexible ships or specialized, and debt or equity finance make a difference on the financial performance of the shipping companies. Management skills that optimize cashflow on a day to day basis through efficient ship management and resourceful chartering are also beneficial to the shipping company.

Operating costs (which represent the fixed costs of running a ship), voyage costs (which are variable and depend on the way in which the ship is employed) and capital costs define the cash outflow of a shipping company. Operating costs can be reduced by operating under a flag that allows the use of a low-cost third world crew, or by purchasing a highly automated ship. Voyage costs are dominated by bunker prices which can be controlled or reduced by investing in modern tonnage with fuel-efficient machinery.

Cash inflow is related to the revenue generated when the owner “plays” the spot market in which he accepts full market risk, or from a time charter, which shifts the risk to the charterer. Earnings also depend on the “productivity” of the ship, i.e., the number of tons of cargo it can carry in a year. Age, size, technical flexibility and cargo management all play a part in generating more revenue and cutting costs.

As far as the capital account is concerned, a large modern ship financed by debt carries an annual cash flow for interest and debt repayment in excess of its operating costs, whereas a small older vessel financed on equity would have no cash flow obligations on the capital account. As a result, the owner of a small, old vessel can afford to withdraw during depressions until conditions improve, whereas the owner of the large, modern, debt-financed vessel faces a fixed capital charge that must be paid even if the ship is laid up.

The money to finance ships comes from three main markets: 1) money markets (short-term debt), 2) capital markets (long-term debt), and 3) stock markets (equity). The

shipping company may access these financial markets directly or indirectly through an intermediary such as a commercial bank. The most common financial structures for raising ship finance are equity, debt and leasing.

The shipping industry is greatly affected by wars, conflicts and humanitarian disasters. So far, merchant ships have been contracted for and participated in numerous crisis situations. World War II, the Korean War, the Vietnam War, the Falklands War, Operations Desert Shield and Desert Storm, the 2006 Lebanon evacuation and humanitarian relief missions, such as hurricane Katrina, are only some of the major events in which merchant mariners risked their lives for the public good. These crises also showed defense planners that the ability of a maritime nation to mobilize a large tonnage for sea-lift operations is vital for the security of the state.

Nations and international organizations use different methods to maintain a capable merchant fleet for emergency situations. We analyzed the Greek and U.S. examples as well as the sealift initiatives of NATO and the EU. Greek needs are covered by requisitioning legislation, while the U.S.A. uses a variety of schemes (RRF, Prepositioned Ships, MSP and VISA). NATO and the EU are using the AMSCC and the MCCE.

When states and international organizations contract merchant ships, they face considerations that private shippers do not. National security and the catastrophic possibility that merchant ships will be unavailable when needed are the most important issues. However, even for state or international organizations, cost reduction is an attractive option. Government contractors should be aware of the pros and cons of each contracting method.

On-spot charter prices fluctuate according to market trends. High international freight prices will raise the cost of a sealift that uses chartered vessels. When freight rates are high, shipowners have a lot of business and they benefit from higher prices. If they do not get a government contract, they will get other profitable contracts. Thus, military or other government organizations might be forced to pay high prices when there is high

demand for ships in the market. Usually this is the case when sealift assets must be found on short notice for a civilian evacuation operation or humanitarian assistance.

Purchasing the option of future transportation capability is common between shippers who have an in-depth knowledge of the freight market. Even if futures and options are very widely traded in the commodities and stock markets respectively, in the shipping market, options trading remains a field reserved for knowledgeable experts. For this reason, options trading is not common among state organizations because of the lack of shipping market expertise and the great capacity needed, should a contingency arise. However, the U.S.A has adopted the business model of purchasing future options for contracting merchant vessels in order to maintain a reliable contingency sealift capability, and to assist the domestic shipping industry. That was made possible by the Maritime Security Act (MSA) of 1996 and by paying an annual fee to preselected U.S. shipping companies.

Leasing is a common method of operating merchant vessels. The owner (lessor) buys the ship but has no intention of operating her. She is an investment made to generate cash. In addition, the owner takes advantage of the ship's depreciation and the possible tax benefits that come from it. Most leases in the shipping industry are capital leases. It is again the U.S.A. that has successfully applied the leasing business model in order to enhance sealift capabilities.

Finally the requisition of merchant vessels has been applied in the past (e.g., WWII, Operation Corporate) by almost all maritime nations. Usually, the decision for requisition follows a state of emergency declaration and needs authorization from the nation's political leadership. Merchant vessels that are required to participate in naval operations as well as for surge and sustainment sealift have been preselected by the respective navies, and are requisitioned together with their crews. Even if the requisition is a contract between the shipper (military or government organization) and the shipowner, it does not follow normal business transaction procedures. There is no speculation concerned, no supply and demand equilibrium and no volatility of freight rates. The state is in an emergency and compels the participation of the shipping industry.

Nations and organizations use one or more of the above methods of contacting merchant vessels for sealift and naval operations. The decision makers analyze the following variables in making their choices: the short and long-term performance of the international shipping market, the competence of the national shipping industry, concerns of national security, maritime strategy and foreign policy, the maritime and acquisition legislation of the nation or the organization and finally, the economic strength of the respective nation or organization.

A. CONCLUSIONS AND RECOMMENDATIONS

1. The Shipping Industry

Conclusion: Thorough knowledge of the shipping industry and the shipping markets is required by plans and policy decision makers.

Shipping is a volatile service industry that is responsible for the stability of the international trade. Price, speed, reliability and security are key factors for its successful performance. It is also the shipping industry that provides the sealift capacity to nations and international organizations for military or humanitarian operations.

Recommendation: Educate all line naval officers, plans and policy decision makers, and contract / acquisition officers accordingly.

It is necessary for a maritime nation to adequately educate her naval officers, decision-making executives, planners and contract / acquisition officers. International shipping routes must stay open and safe for the international trade. Decision-makers and planners must be aware of the capabilities and limitations of the shipping industry and contract officers must be capable of dealing with the demanding and competitive business of chartering and marine insurance. Government institutions (e.g., the Naval Postgraduate School) for continuous education for military officers and civilian executives should include the shipping business in their respective curricula.

Conclusion: The shipping markets follow the model of supply and demand.

When transportation capacity is needed and government executives investigate the different options for contracting merchant ships, they must be aware of current and future trends of the shipping industry. When there is high demand for merchant ships the shipowners will sell their services for higher prices. When there is plenty of supply, then the freight rates fall.

Recommendation: Knowledge of the shipping markets, careful planning of future sealift requirements and support for a competitive free-market shipping business environment. Support of initiatives such as the Athens Multinational Sea-lift Cooperation Center (AMSCC) whose purpose is to reduce the side costs of charter parties (e.g., there are no broker fees, administrative fees, advisory fees) and enhance competition between shipowners.

A competitive free market environment will make shipowners compete for business and will reduce prices. However, planners and contracting officers must be aware of the market cycles that dominate shipping risk. Economic cycles in the shipping market are “episodic” rather than regular. There are troughs, recoveries, peaks and collapses. Big freight booms are often the result of unexpected events, such as the closing of the Suez Canal, stockpiling or congestion. Recessions tend to be driven by economic shocks which cause an unexpected decline in trade. Predicting cycles is difficult, but not impossible for skilled executives. Good predictions and forecasts will enhance future planning and decision-making for future sealift requirements. Finally, organizations such as the AMSCC offer vital information and free services to its members. In addition, they enhance competition since there are bids from multiple shipowners and operators (currently there are 156 shipping companies cooperating with AMSCC).

Conclusion: On-spot chartering offers advantages and disadvantages for nations or organizations that decide to do so.

Advantages

- There is no need for a big national flag registry. The nation can contract ships from the international market. However, national security reasons might limit the pool of available vessels to the flag registries that the state feels comfortable with.
- There is no need to maintain a large national pool of mariners and shipping industry specialists.
- The state can avoid operating and maintenance costs. It can also benefit from choosing to be self - insured.
- The state can select a merchant vessel with special characteristics (e.g. a survey vessel or a floating dock) from the market for a particular period of time and a specific task.
- When market conditions are right, the state can take advantage of low freight rates.

Disadvantages

- It is difficult and probably expensive for the state to contract foreign merchant ships for participation in a war zone (e.g., during the Falklands conflict).
- When freight rates are high, on-spot chartering of merchant vessels is very expensive.
- The respective military or government organization must have a competent staff that follows the market and is knowledgeable of the shipping industry and especially shipping contracts. Otherwise, private contract advisors / specialists must be used.
- There is an immediate need for cash outflow that might not have been appropriated. Even if governments can usually borrow money with lower interest rates, unscheduled spending disrupts every government's plans.
- It is, in our opinion, very difficult for a navy that plans a big naval operation to acquire an adequate sealift capability in a short period of time. On-spot chartering cannot meet all the sealift needs of major naval operations that have to be executed in a short period of time and need a large sealift capability.

Recommendation: Naval officers and government executives should plan accordingly.

On-spot chartering may be useful for covering an emergency situation or supplement an already pre-organized sealift fleet. On-spot chartering of a great number of merchant vessels for the support of an expeditionary force (such as the one that participated in Operation Corporate) may prove very expensive, threaten the security of operations or even their actual performance, if the shipowners decide not to participate in war-zone operations.

Conclusion: Purchasing a transportation capacity option offers advantages and disadvantages for nations or organizations that decide to do so.

Advantages

- There is no need for a big national flag registry. The nation can contract ships from the international market. However, national security reasons might limit the pool of vessels available to the flag registries that the state feels comfortable with.
- There is no need to maintain a large national pool of mariners and shipping industry specialists.
- The state can avoid operating and maintenance costs. It can also benefit from the insurance policy that it will select.
- The state can select a merchant vessel with special characteristics (e.g. a survey vessel or a floating dock) from the market for a particular period of time and for a specific task.
- There is no dependence on the fluctuation of the freight rates. The volatility of the shipping market is irrelevant.
- When the purchase of the option follows the American model (\$2.1 million per ship per year), it creates leverage for the shipping industry, especially at periods of low freight rates.
- The state is aware of future payments and can budget and schedule accordingly.
- The state can avoid an initial high capital expense.
- A large and diversified pool of available merchant vessels that could support any naval operation can be created.

Disadvantages

- The state cannot take advantage of low freight rates when the shipping market is down.
- Even if the state never uses the option, there will be a continuous outflow of cash for as long as the option has been bought.
- When there are no restrictions in the flag registry of the vessels security issues might rise especially when the ships have to participate in combat operations

Recommendation: Naval officers and government executives should plan accordingly.

The Purchasing Transportation Capacity Option can be a very good contracting method for states that expect to be involved in future large scale military operations (e.g., U.S.A. expecting to have a military presence in the Persian Gulf for the next twenty years). It is also a very good solution for international organizations (e.g., NATO, the E.U., and the U.N.) that do not want to get involved in the daily management and maintenance of sea-lift assets but on the other hand, wish to have *ad hoc* sealift assets available.

Conclusion: Leasing offers advantages and disadvantages for nations or organizations that decide to do so:

Advantages

- The state can select a merchant vessel with special characteristics (e.g. a survey vessel or a floating dock) from the market for a particular period of time and for a specific task.
- There is no exposure to fluctuation of freight rates. The volatility of the shipping market is irrelevant.
- The state is aware of future payments and can budget and schedule accordingly.
- A large and diversified pool of available merchant vessels can be created that could support any naval operation.
- A large and diversified pool of available merchant vessels that could support any naval operation can be created.
- The state can avoid initial capital expenses.
- Security issues can be controlled, since the state operates the vessel.

- The leasing contract might permit the state to acquire the ships after the leasing period ends (capital lease).

Disadvantages

- The state cannot take advantage of low freight rates.
- Even if the state never uses the ships in naval operations, there will be a continuous outflow of cash for as long as the leasing lasts.
- In order to operate the leased vessels, a large national pool of mariners and shipping industry specialists must exist.
- Capital leases usually require that the state must take care of operating and maintenance costs.

Recommendation: Naval officers and government executives should plan accordingly.

Leasing can be a very good solution for decision makers when there is an urgent need for an asset and they are called to decide “lease or do without.” The U.S. TAKX program proved to be very successful.

Conclusion: Requisition offers advantages and disadvantages for nations or organizations that decide to do so:

Advantages

- There is no exposure to fluctuating freight rates. The volatility of the shipping market is irrelevant.
- Cash outflow for the state is limited to the period that the ships are requisitioned. The funds paid for their ships are not negotiable.
- The state does not pay the maintenance costs of the ships.
- After a declaration of Active Service, merchant ships and their crews go under the Naval Discipline Act. This means that the Navy (state) has the power to direct merchant ships’ actions and movements quite specifically, even if it is against the master’s wishes and would put them at risk.
- Requisitions can only work for national flag shipping. Most maritime states require that a certain percentage of the crew be citizens of the state. This enhances security of operations.
- Requisition laws “protect” the shipowners from being held liable to legal action when they break existing contracts in order to bring the ships into Active Service.

Disadvantages

- If the state does not have an adequate national flag shipping registry, requisitioning is not a good solution for acquiring a large number of merchant vessels. Greece, Norway and the U.K are three NATO countries that have a big merchant fleet and requisitioning could work well for them.
- The state must have a large national pool of mariners and shipping industry specialists.
- Specialized vessels might be hard to requisition if they do not exist in the national flag registry.
- The state pays the operational costs of the ships.

Recommendation: Naval officers and government executives should plan accordingly.

Requisition is a method for acquiring sealift assets when the state is in a state of great emergency and all available assets should be used in order to cope with it. It requires the availability of a big national flag registry to fulfill sealift requirements are fulfilled. The success of requisition will depend on the available existing plans that determine which ship will be used for what mission and all the necessary transformation and repair work that needs to be done.

2. Maritime Strategy and Sealift Assets

Conclusion: The sea-lift policy that a state or an organization will choose depends on its maritime and foreign policy, as well as the required assets needed to implement it.

There is a variety of means by which different states meet their national security requirements. Maritime nations, such as Greece that depend on maritime trade for their survival, or global powers, such as the U.S.A. that need to control the oceans for maintaining their global superiority, both need a great number of sealift assets. In order to have them available when they will be needed, states or organizations adopt different policies. Greece that has a large Greek-flagged merchant fleet has adopted requisition as the main policy for acquiring sealift assets. The U.S.A., which lacks a large national

merchant fleet, but is nonetheless committed to global projection of power, has adopted multiple methods of sea-lift assets acquisition -- to include leasing, options, and ownership. Other nations that do not depend on sea-trade for their survival (e.g., Canada), might implement policies that make sealift assets available to them only in cases that human lives are at risk (e.g., humanitarian operations and civilian evacuations).

Recommendation: The state or organization must have clear a military and foreign policy agenda so that officers, planners and executives can plan the sea-lift requirements accordingly.

Well-defined military and foreign policy agendas and timely planning of the required sealift assets for military or humanitarian operations may permit planners to develop good and cost-effective contingency plans.

Conclusion: Nations that have an adequate and capable merchant fleet and a prosperous shipping industry have an advantage when they need to execute naval and sealift operations.

When there is a large pool of merchant vessels to select from and merchant mariners to crew them, planners and naval officers have more choices, especially if specialized vessels are needed. In addition,, security standards are met, since most of the mariners are citizens of the state that is using the assets.

Recommendation: States, and especially the ones that depend on their maritime industry for survival and prosperity, must support their maritime industry, the maritime education, and their mariners.

State policies should be implemented to attract shipping investment and development. Tax benefits, good infrastructure and adequate state legislation are some of the mechanisms that can assist in the establishment of shipping companies and can encourage shipowners to raise the state's flag. Young people should be encouraged to follow the naval profession. One lesson learned from the Falklands conflict was that the rapid deployment of the British merchant navy was due to the professionalism and dedication of the British merchant mariners and the British maritime industry as a whole.

Conclusion: The creation of the Athens Multinational Sealift Coordination Center (AMSCC) is a positive and useful action that will enhance the sea-lift capability of the states or organizations that have signed a Memorandum of Understanding (MOU).

Greek know-how of the shipping industry can become very useful for nations that do not have a large shipping industry and for international organizations. It costs nothing to nations or organizations to become members of the AMSCC and they can profit from the non-existent brokerage fees, advisory fees and the large pool of shipowners to compete for the contracts. Participating nations have access to a large pool of merchant vessels and can benefit from the infrastructure of AMSCC to conduct Naval Cooperation and Guidance for Shipping¹³ operations in cooperation with the Hellenic Ministry of Mercantile Marine and the Hellenic Navy.

Recommendation: Nations and organizations should consider participating in AMSCC. AMSCC should become multi-modal and combine sea – air and land transportation co-ordination capabilities.

States and organizations that do not permanently own sealift assets should consider AMSCC as their point of contact for chartering merchant ships. Nowadays, transportation and logistics require an integral approach and door-to-door service. AMSCC should consider the option of becoming multimodal and integrating its services.

3. International Organizations and Sealift

Conclusion: The European Union will need sealift assets in the future.

The formation of European Union Battlegroups requires associated sealift capabilities. The E.U. includes three states that have a large flag registry: Cyprus, Greece and Malta. Cyprus, Greece and the European Committee are already members of AMSCC, which leverages the EU's sealift capabilities.

¹³ Naval Control and Guidance for Shipping (NCAGS) provides support to military commanders and merchant shipping in peacetime, tension, crisis and conflict through co-operation, guidance, advice, assistance and, where necessary, supervision. Additionally, it provides military guidance, advice or assistance in respect of participating nations' global, maritime commercial interests to enhance the safety of merchant vessels and to support military operations [ATP 2(B) – Vol. II].

Recommendation: The European Committee and the first permanent E.U. operational headquarters in Brussels must consider standing procedures for contracting sealift assets from AMSCC.

Standing procedures will reduce bureaucratic delays and enhance timeliness of sealift response to EU needs.

B. RECOMMENDATIONS FOR AREAS OF FURTHER RESEARCH AND STUDY

1. Potential Future Research

Can we more accurately determine the economic cycles in shipping? Economic cycles in the shipping market are “episodic” rather than regular. There are troughs, recoveries, peaks and collapses. Predicting cycles is difficult, but not impossible for skilled executives. Finding a mathematical method to predict the economic cycles in shipping would reduce shipping risk.

Can we find a formula with which we can evaluate the options’ prices for future freight rates and future transportation capability? The Black-Scholes formula for the prices of European calls and puts does not perform too well in empirical studies of shipping freight rates.

2. Potential Future Study

What environment of rules and regulations would help the development of a prosperous shipping industry?

How can the state assist the shipping industry to develop in a way that will enhance its national sealift capabilities, if those are needed (subsidizing the acquisition of particular ships e.g., Ro-ros, appropriate shipbuilding and ship repair infrastructure in order to transform regular merchant vessels in sealift assets, etc.)?

Each state has different sealift requirements. Future potential studies could include the sealift requirements for the next five, ten, fifteen or twenty years.

Which conditions, circumstances and regulations may enhance the leasing option for different states or international organizations?

APPENDIX A. GLOSSARY OF TERMINOLOGY USED IN THE SHIPPING INDUSTRY

CHARTERING BUSINESS

Shipper: An individual or an organization (public or private) with cargo to transport by sea.

Shipowner: An individual or an organization (public or private) with ship for hire.

Charterer: An individual or an organization (public or private) that hires a ship.

Charter-party: Contract setting out the terms on which the shipper contracts for the transportation of his cargo or the charterer contracts for the hire of a ship.

Voyage charter: The ship earns freight per ton of cargo transported on terms set out in the charter party, which specifies the precise nature and volume of cargo, the port(s) of loading and discharge and the laytime and demurrage. All the costs are paid by the shipowner.

Contract of affreightment (COA): The shipowner undertakes to carry quantities of a specific cargo on a particular route or routes, over a specific period of time, using ships of his choice with specified restrictions.

Time charter: The vessel is hired for a specific period of time for payment of a daily, monthly or annual fee. There are several types of time chartering: *Period time charter* where the ship earns daily hire, paid monthly or semi-monthly in advance. The shipowner retains possession and mans and operates ship under instructions from the charterer who pays the voyage costs; *Time charter trip* which is fixed on a time charter basis for the period of a specific voyage and for the carriage of a specific cargo. Shipowner earns 'hire' per day for the period determined by the voyage.

Bareboat or demise charter: The owner of a ship contracts (for a fee, usually long term) to another party for its operation. The ship is then operated by the second party as if he owned it.

Laytime: The period of time agreed between the parties in a voyage charter for loading / discharging the cargo.

Demurrage: Liquidated damages payable to the shipowner for delay for which he is not responsible in loading and / or discharging beyond the laytime.

Despatch: The money that the owner agrees to repay if the ship is loaded or discharged in less than the laytime allowed in the charter party (customarily = ½ demurrage).

**APPENDIX B. MERCHANT VESSELS THAT PARTICIPATED IN
THE FALKLANDS CAMPAIGN**

TROOP TRANSPORTS

NAME	ENTERED WARZONE	TONNAGE	SHIPPING COMPANY
Queen Elisabeth II	5/23/08	67,000	Cunard Liner (requisitioned)
Canberra	5/13/08	44,807	P&O Liner (requisitioned)
Norland	5/13/08	12,000	P&O Ro-Ro Ferry (requisitioned)
Tor Caledonia	6/6/82	10,000	Whitwill Ro-Ro Ferry (requisitioned)
St Edmunds	6/7/82	9,000	Sealink Ro-Ro Ferry (requisitioned)
Nordic Ferry	6/25/82	6,500	Townsend Thorsen Ro-Ro Ferry (requisitioned)
Baltic Ferry	6/25/82	6,500	Townsend Thorsen Ro-Ro Ferry (requisitioned)
Elk	5/13/82	5,463	P&O Ro-Ro Ferry (requisitioned)
Europe	5/13/82	4,190	Townsend Thorsen Ro-Ro Ferry (requisitioned)
Atlantic Conveyor	5/13/08	14,496	Cunard containership converted to aircraft ferry (requisitioned)
Contender Bezant	6/7/08	11,000	Sea Containers Ltd containership (requisitioned)

TEV Rangatira	-	-	Transported regular and reserve troops to the Falklands from UK. (requisitioned)
Astronomer	6/8/82	-	Taken up from trade and converted to a make-shift aircraft carrier
Atlantic Causeway	-	-	Ro-Ro containership converted to makeshift helicopter carrier

SUPPLY SHIPS

NAME	ENTERED WARZONE	TONNAGE	SHIPPING COMPANY
Fort Austin	4/26/82	23,600	RFA Fleet Replenishment Ship
Fort Grange	5/26/82	23,600	RFA Fleet Replenishment Ship
Resource	4/25/82	22,890	RFA Fleet Replenishment Ship
Regent	5/8/82	22,890	RFA Fleet Replenishment Ship
Stromness	5/13/82	16,792	RFA Stores Support Ship
Saxonia	5/20/82	8,000	Cunard freighter (requisitioned)
Lycaon	5/21/82	11,804	Chartered freighter; China Mutual Steamship (requisitioned)
Geestport	6/6/82	9,750	Chartered freighter; China Mutual Steamship (requisitioned)

SUPPORT SHIPS

NAME	ENTERED WARZONE	TONNAGE	SHIPPING COMPANY
Uganda	5/8/82	16,907	P&O Liner; Converted to hospital ship (requisitioned)
British Enterprise	5/8/82	1,600	BUE North-Sea oil-rig support ship (requisitioned)
Stena Seapsread	5/8/82	6,061	Stena North-Sea oil rig support ship (requisitioned)
Stena Inspector	5/8/82	7,000	Stena North-Sea oil rig support ship (requisitioned)
Engadine	6/2/82	9,000	RFA Helicopter Support Ship
HMS Pict	5/18/82	1,478	United Trawlers; Requisitioned as Minesweeper Tender
HMS Cordella	5/18/82	1,238	J. MARR Trawler; Requisitioned as Minesweeper
HMS Farnella	5/18/82	1,207	J. MARR Trawler; Requisitioned as Minesweeper
HMS Junella	5/18/82	1,615	J. MARR Trawler; Requisitioned as Minesweeper
HMS Northella	5/18/82	1,238	J. MARR Trawler; Requisitioned as Minesweeper
Salvageman	5/2/82	1,568	United Towing Ocean Tag (requisitioned)
Yorkshireman	5/9/82	689	United Towing Ocean Tag (requisitioned)
Irishman	5/9/82	689	United Towing Ocean Tag

			(requisitioned)
Wimpey Seahorse	6/2/82	1,599	Wimpey Marine Ocean Tug (requisitioned)
St Helena	–	3,150	United International Bank Ltd island supply ship (requisitioned)
Iris	5/21/82	3,873	BT cable ship (chartered)
Avelona Star	–	–	Refrigerated Stores; ship loaded with food (chartered)
Laertes	–	–	Ammunition ship (chartered)
Europic ferry	–	4,190	Townsend Thorensen ferry (chartered)
M/V Strathewe	–	–	General cargo ship (chartered)

TANKERS

NAME	ENTERED WARZONE	TONNAGE	SHIPPING COMPANY
Bayleaf	6/9/82	40,000	RFA Tanker
Brambleleaf	Was there	40,000	RFA Tanker
Plumleaf	6/9/82	25,790	RFA Tanker
Scottish Eagle	6/10/82	33,000	King Line Tanker (chartered)
Alvega	6/10/82	33,000	Finance for Shipping Ltd (chartered)
Balder London	6/10/82	33,000	Lloyds of London Tanker (chartered)
Olmeda	4/25/82	36,000	RFA Tanker

Olna	5/23/82	36,000	RFA Tanker
Tidespring	4/17/82	27,400	RFA Tanker
Tidepool	5/13/82	27,400	RFA Tanker
Pearleaf	5/4/82	25,790	RFA Tanker
Fort Toronto	5/12/82	19,982	Canadian Pacific Water Tanker (chartered)
Eburna	5/27/82	19,763	Shell Tanker (chartered)
G. A. Walker	–	18,744	BP Tanker (chartered)
British Dart	5/14/82	15,650	BP Tanker (chartered)
British Tamar	–	–	BP Tanker (chartered)
British Test	5/21/82	16,653	BP Tanker (chartered)
British Tay	4/23/82	15,650	BP Tanker (chartered)
British Trent	5/5/82	15,649	BP Tanker (chartered)
British Wye	5/25/82	15,649	BP Tanker (chartered)
British Esk	4/22/82	15,643	BP Tanker (chartered)
British Avon	–	15,640	BP Tanker (chartered)
Anco Charger	5/15/82	15,974	P&O Tanker (chartered)
Blue Rover	5/2/82	11,522	P&O Tanker (chartered)

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**APPENDIX C. LIST OF HUMANITARIAN RELIEF
OPERATIONS CONDUCTED BY THE USA**

OPERATION	DATE	LOCATION
Sharp Edge	1990-1991	West Africa
Desert Shield/Storm	1990-1991	Persian Gulf
Support Democracy	1990-1995	Persian Gulf
Eastern Exit	1991	Persian Gulf
Southern Watch	1991-1995	Iraq
Provide Comfort	1991-1995	Middle East
Sea Angel	1991	Bangladesh
Fiery Vigil	1991	Philippines
Etna	1992	Italy
Provide Promise	1992-1995	Southeast Europe
Water Pitcher	1992	Southwest Pacific
Typhoon Omar	1992	Southwest Pacific
Hurricane Andrew	1992	Florida
Hurricane Iniki	1992	Hawaii
Restore Hope	1992-1995	Somalia
Garden Plot	1993	Eastern Pacific
Maintain Democracy	1993-1995	Caribbean
Support Hope	1994-1995	Africa
Vigilant Warrior	1994-1995	Persian Gulf
Tsunami Relief	2004	SE Asia
Hurricane Katrina	2005	Louisiana

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APPENDIX D. PREPOSITIONING SHIPS [21]

- PFC JAMES ANDERSON JR., MV
- CAPT STEVEN L. BENNETT, MV
- 2ND LT JOHN P. BOBO, USNS
- 1ST LT ALEX BONNYMAN, MV
- SGT WILLIAM R. BUTTON, MV
- CAPE JACOB, SS -- *Cape Jacob is part of the RRF, but is activated for duty with the Prepositioning Program.*
- SSG EDWARD A. CARTER, JR., MV
- CHARLTON, USNS
- CURTISS, SS -- *SS Curtiss is part of the RRF, but is dedicated to USMC aviation logistics support under the Prepositioning Program.*
- DAHL, USNS
- MAJ BERNARD F FISHER, MV
- CPL LOUIS J. HAUGE JR., MV
- SGT MATEJ KOCAK, SS
- 1ST LT BALDOMERO LOPEZ, USNS
- 1ST LT JACK LUMMUS, USNS
- 1ST LT HARRY L. MARTIN, USNS
- PFC EUGENE A. OBREGON, SS
- LTC JOHN U. D. PAGE, MV
- MAJ STEPHEN W. PLESS, SS
- POMEROY, USNS
- RED CLOUD, USNS
- SISLER, USNS
- SODERMAN, USNS
- GYSGT FRED W. STOCKHAM, USNS
- SWIFT, HSV 2
- WATKINS, USNS
- WATSON, USNS

- WESTPAC EXPRESS, MV
- LCPL ROY M. WHEAT, USNS
- VADM K. R. WHEELER, MV
- PFC DEWAYNE T. WILLIAMS, USNS
- WRIGHT, SS -- *SS Wright is part of the RRF, but is dedicated to USMC aviation logistics support*

APPENDIX E. MARITIME PREPOSITIONING SHIPS [21]

- PFC JAMES ANDERSON JR., MV
- 2ND LT JOHN P. BOBO, USNS
- 1ST LT ALEX BONNYMAN, MV
- SGT WILLIAM R. BUTTON, MV
- CPL LOUIS J. HAUGE JR., MV
- SGT MATEJ KOCAK, SS
- 1ST LT BALDOMERO LOPEZ, USNS
- 1ST LT JACK LUMMUS, USNS
- 1ST LT HARRY L. MARTIN, USNS
- PFC EUGENE A. OBREGON, SS
- MAJ STEPHEN W. PLESS, SS
- SISLER, USNS
- GYSGT FRED W. STOCKHAM, USNS
- LCPL ROY M. WHEAT, USNS
- PFC DEWAYNE T. WILLIAMS, USNS

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APPENDIX F. ARMY PREPOSITIONED STOCKS-3 SHIPS [21]

- SSG EDWARD A. CARTER, JR., MV
- CHARLTON, USNS
- DAHL, USNS
- LTC JOHN U. D. PAGE, MV
- POMEROY, USNS
- RED CLOUD, USNS
- SODERMAN, USNS
- WATKINS, USNS
- WATSON, USNS

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APPENDIX G. NAVY, DLA AND AIR FORCE SHIPS [21]

- CAPT STEVEN L. BENNETT, MV
- CAPE JACOB, SS -- *Cape Jacob is part of the RRF, but is activated for duty with the Prepositioning Program.*
- CURTISS, SS -- *SS Curtiss is part of the RRF, but is dedicated to USMC aviation logistics support under the Prepositioning Program.*
- MAJ BERNARD F FISHER, MV
- SWIFT, HSV 2
- WESTPAC EXPRESS, MV
- VADM K. R. WHEELER, MV
- WRIGHT, SS -- *SS Wright is part of the RRF, but is dedicated to USMC aviation logistics support.*

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APPENDIX H. THE THREE SQUADRONS OF MPS AND A PARTIAL LIST OF CARGO [21]

MPS-1 / MPSRON ONE : MEDITERRANEAN

- USNS 2ND LT JOHN P. BOBO
- USNS LCpl Roy Wheat

MPS-2 / MPSRON TWO: Diego Garcia

- AMSEA AK 3012 SGT W. R. BUTTON *
- USNS 1ST LT B. LOPEZ
- SS SGT MATEJ KOCAK
- MV CAPT Steven L. Bennett,
- MV SSG Edward A. Carter, Jr.
- SS PFC Eugene A. Obregon
- MV LTC John U. D. Page
- USNS Sisler
- USNS PFC Dewayne T. Williams

MV SGT William R. Button

MPS-3 / MPSRON THREE: Guam

- AMSEA AK 3011 1ST LT JACK LUMMUS *
- MV PFC J. ANDERSON, JR.
- MV 1ST LT A. BONNYMAN
- SS CAPE JACOB
- MV CPL L. HAUGE, JR *
- SS MAJ S. W. PLESS
- MV MAJ BERNARD F FISHER
- USNS POMEROY

- MV VADM K.R. WHEELER
- USNS 1ST LT HARRY MARTIN

Partial list of a sample loadout of the MPSRON One ships [22]

<u>Quantity</u>	<u>Item</u>
5.2	Million gallons cargo fuel
2,174	50,000-pound cargo containers
76	TOW missile launchers
24	Light armored vehicles (LAV)
105	Amphibious assault vehicles (AAV)
30	Combat tanks (M1A1)
30	155mm howitzers
123	Electrical generators
1	Field hospital (200 beds)
14	50,000-pound container handlers
8	25-ton cranes
16	7.5-ton cranes
47	Floodlight sets
7	Tactical airfield fuel dispensing systems
6	Motorized road graders
4	Wheeled scraper trackers
104	3,000-gallon collapsible fabric tanks
50	Tractors (various types)
107	Forklift trucks (various types)

41	Reverse osmosis water purification units
203	Cargo trailers
89	Powered trailers (various types)
282	5-ton cargo trucks
42	5-ton dump trucks
22	5-ton wrecker trucks
530	Cargo/troop carriers (HMMWV)

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APPENDIX I. THE READY RESERVE FLEET [21]

- ALGOL, SS
- ANTARES, SS
- BELLATRIX, SS
- ADM WM. M. CALLAGHAN, GTS
- CAPE DECISION, MV
- CAPE DIAMOND, MV
- CAPE DOMINGO, MV
- CAPE DOUGLAS, MV
- CAPE DUCATO, MV
- CAPE EDMONT, MV
- CAPE FAREWELL, SS
- CAPE FLATTERY, SS
- CAPE GIBSON, SS
- CAPE GIRARDEAU, SS
- CAPE HENRY, MV
- CAPE HORN, MV
- CAPE HUDSON, MV
- CAPE INSCRIPTION, SS
- CAPE INTREPID, SS
- CAPE ISABEL, SS
- CAPE ISLAND, SS
- CAPE JACOB, SS -- *Cape Jacob is part of the RRF, but is activated for duty with the Prepositioning Program.*
- CAPE KENNEDY, MV
- CAPE KNOX, MV
- CAPE MAY, SS
- CAPE MOHICAN, SS
- CAPE ORLANDO, MV
- CAPE RACE, MV

- CAPE RAY, MV
- CAPE RISE, MV
- CAPE TAYLOR, MV
- CAPE TEXAS, MV
- CAPE TRINITY, MV
- CAPE VICTORY, MV
- CAPE VINCENT, MV
- CAPE WASHINGTON, MV
- CAPE WRATH, MV
- CAPELLA, SS
- CHESAPEAKE, SS
- CORNHUSKER STATE, SS
- CURTISS, SS -- *SS Curtiss is part of the RRF, but is dedicated to USMC aviation logistics support under the Prepositioning Program.*
- DENEbola, SS
- FLICKERTAIL STATE, SS
- GEM STATE, SS
- GOPHER STATE, SS
- GRAND CANYON STATE, SS
- KEYSTONE STATE, SS
- PETERSBURG, SS -- *SS Petersburg was released from prepositioning duties and returned permanently to the RRF on 13 Dec 2007. Replaced by MV VADM K.R. Wheeler.*
- POLLUX, SS
- REGULUS, SS
- WRIGHT, SS -- *SS Wright is part of the RRF, but is dedicated to USMC aviation logistics support.*

APPENDIX J. NAVAL FLEET AUXILIARY FORCE [21]

APACHE, USNS

ARCTIC, USNS

BIG HORN, USNS

BRIDGE, USNS

RICHARD E. BYRD, USNS

COMFORT, USNS

CONCORD, USNS

WALTER S. DIEHL, USNS

AMELIA EARHART, USNS

JOHN ERICSSON, USNS

FLINT, USNS

GRAPPLE, USNS

GRASP, USNS

LEROY GRUMMAN, USNS

GUADALUPE, USNS

HENRY J. KAISER, USNS

KANAWHA, USNS

KISKA, USNS

LARAMIE, USNS

JOHN LENTHALL, USNS

LEWIS AND CLARK, USNS

MERCY, USNS

MOUNT BAKER, USNS

NAVAJO, USNS

PATUXENT, USNS

ROBERT E. PEARY, USNS

PECOS, USNS

RAINIER, USNS

RAPPAHANNOCK, USNS

SACAGAWEA, USNS

SAFEGUARD, USNS

SALVOR, USNS

SAN JOSE, USNS

SATURN, USNS

SHASTA, USNS

ALAN SHEPARD, USNS

SIOUX, USNS

SUPPLY, USNS

TIPPECANOE, USNS

YUKON, USNS

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